



DO NOT REMOVE FROM LIBRARY



Digitized by the Internet Archive
in 2011 with funding from
Boston Library Consortium Member Libraries



Northeastern University

Undergraduate Bulletin

1990

1991

Northeastern University

1990–1991
Undergraduate Bulletin

Northeastern University (USPS 989-040) is published by Northeastern University at 360 Huntington Avenue, Boston, Massachusetts 02115, five times a year; once in January, once in August, once in September, and twice in October. Second-Class Postage Paid at Boston, Massachusetts, and at additional mailing offices. Volume XVIII, Number 2, August 30, 1990.

POSTMASTER, send address changes to:
Northeastern University
Department of Undergraduate Admissions
360 Huntington Avenue
Boston, Massachusetts 02115

Message from the President

Northeastern University, located in the heart of Boston, is an exciting, vibrant place to pursue a college education. I am proud and delighted to introduce the University to you.

At Northeastern, all our efforts are directed toward the individual student's academic achievement, career development, and social and intellectual growth. We are dedicated to serving students who seek to graduate from college already prepared to take their places in a productive economy as well as to serving students who seek to graduate from college with a broad foundation for a variety of careers and for intelligent citizenship.

With the nation's increased demand for an educated, well-trained workforce, Northeastern prepares people to be productive contributors to their own and to society's economic well-being. At the same time, the University provides students with a broad-based understanding of cultural, moral, and artistic values, because economic well-being alone is insufficient to productive lives and human happiness.

Cooperative education, linking the real world of practical experience with an academy of scholars and teachers, represents Northeastern's distinctive edge. The strength of co-op is its close connection with the world of work and with the needs of students.

Northeastern's practical approach to a college education complements the University's emphasis on academic life. We offer a broad spectrum of liberal arts and professional programs taught by a distinguished faculty dedicated to excellence in teaching, innovation in scholarship, and creativity in research.

Each year students graduate from Northeastern with a head start on their careers and a good sense of themselves and their relationship to the community, enhanced and strengthened by new knowledge, new awareness, and new skills that will form the basis of personal achievement and satisfaction in the real world. In providing an environment for individual growth and achievement, the University aims to fulfill its historic mission of offering students the opportunity for upward mobility through educational excellence.

John A. Curry
President

Contents

| | |
|---|-----------|
| Academic Calendar | 1 |
| The Urban University | 3 |
| ■ History | 4 |
| ■ The Boston Environment | 6 |
| ■ Campus Highlights | 7 |
| Visitor Information | 8 |
| Undergraduate Admissions | 9 |
| ■ Department of Undergraduate Admissions | 10 |
| General Requirements for Entrance | 13 |
| Admission | 15 |
| Programs for Minority Students | 20 |
| Admission of International Students | 21 |
| Admission of Transfer Students | 22 |
| Deposits Required from Freshmen and Transfer Students | 23 |
| General and Special Health Requirements | 24 |
| Cooperative Education | 25 |
| ■ An Education That Works | 26 |
| Department of Cooperative Education | 27 |
| International Cooperative Education | 28 |
| College Expenses | 29 |
| ■ Tuition and Fees | 30 |
| Annual Costs | 31 |
| Fees | 32 |
| Payment of Tuition | 33 |
| Refunds | 34 |
| ■ Financial Aid | 35 |
| State Assistance Programs | 37 |
| Federal Programs | 38 |
| University Scholarships | 40 |
| Other Scholarships | 40 |

| | |
|--|------------|
| Housing | 41 |
| ■ Department of Residential Life | 42 |
| Academic Policies | 47 |
| ■ Academic Policies at Northeastern | 48 |
| Academic Programs | 51 |
| ■ College of Arts and Sciences | 52 |
| ■ School of Journalism | 95 |
| ■ Boston-Bouvé College of Human Development Professions | 97 |
| ■ College of Business Administration | 113 |
| ■ College of Computer Science | 128 |
| ■ College of Criminal Justice | 137 |
| ■ College of Engineering | 140 |
| ■ School of Engineering Technology | 159 |
| ■ College of Nursing | 168 |
| ■ College of Pharmacy and Allied Health Professions | 173 |
| ■ Alternative Freshman-Year Program (University College) | 190 |
| ■ ROTC, Military Officers' Education Program | 193 |
| ■ Basic College Compensatory Programs | 198 |
| ■ Radiologic Technology Program (University College) | 200 |
| ■ Part-Time Programs at Northeastern | 201 |
| ■ Graduate and Professional Schools at Northeastern | 205 |
| ■ Academic Research | 208 |
| Resources and Support Services | 213 |
| University Libraries | 214 |
| Academic Assistance Center | 217 |
| Alumni Association | 217 |
| Center for the Study of Sport in Society | 218 |
| Counseling and Testing Center | 218 |
| Department of Career Development and Placement | 219 |
| Disability Resource Center | 219 |
| Division of Academic Computing | 221 |
| English Language Center | 221 |
| Hearing, Language, and Speech Center | 222 |
| HELP Legal Services | 222 |
| International Student Office | 222 |

| | |
|---|-----|
| Office of Freshman Affairs | 223 |
| Office of Minority Student Affairs | 223 |
| Orientation Programs for New Students | 224 |
| Preprofessional Advising | 224 |
| Public Safety Division | 224 |
| Reading and Language Skills | 225 |
| Religious Life Office | 225 |
| University Health Services/Lane Health Center | 225 |
| Activities | 227 |
| Student Organizations | 229 |
| Fraternities and Sororities | 230 |
| Intramural and Recreational Sports | 230 |
| Athletic Facilities | 231 |
| Men's Athletics | 231 |
| Women's Athletics | 232 |
| Appendix | 233 |
| ■ Governing Boards and Officers of Northeastern | 234 |
| ■ Administrative Organization | 237 |
| ■ General University Committees | 239 |
| ■ Scholarships | 240 |
| Gifts and Bequests | 261 |
| ■ Honor Societies and Awards | 262 |
| Index | 267 |
| ■ University Map | 278 |

Academic Calendar 1990–1991

September 1990

| | | |
|-------|------------------|--|
| 3 | Monday | Labor Day. University closed. |
| 4–7 | Tuesday–Friday | Final examinations for Basic Colleges. |
| 10–19 | Monday–Wednesday | Division B vacation. |
| 13 | Thursday | Fall Commencement. |
| 17 | Monday | Orientation for freshmen and transfer students. |
| 19–21 | Wednesday–Friday | Continuation of course advising, course registration, course drop/add periods, and orientation for college day programs. |
| 20 | Thursday | Upperclass registration (Division B). |
| 24 | Monday | Classes begin in Basic Colleges for fall quarter, 8:00 A.M. |

October 1990

| | | |
|---|--------|---|
| 8 | Monday | Columbus Day. University closed. |
|---|--------|---|

November 1990

| | | |
|-------|--------------------|---|
| 12 | Monday | Veterans' Day celebrated. University closed. |
| 22–24 | Thursday– Saturday | Thanksgiving Day recess. |

December 1990

| | | |
|-----------|----------------|--|
| 10–14 | Monday–Friday | Final examinations for Basic Colleges. |
| 17–Jan. 1 | Monday–Tuesday | Christmas vacation. |

January 1991

| | | |
|----|-----------|--|
| 1 | Tuesday | New Year's Day. University closed. |
| 2 | Wednesday | Orientation and registration for new freshmen and transfer students; registration for continuing September freshmen and returning upperclass students. |
| 3 | Thursday | Registration, orientation, and course drop/add continues until noon. |
| 4 | Friday | Classes begin in Basic Colleges for winter quarter, 8:00 A.M. |
| 21 | Monday | Martin Luther King, Jr.'s Birthday observed. University closed. |

| | | |
|-----------------------|------------------|---|
| February 1991 | | |
| 18 | Monday | Presidents' Day. University closed. |
| March 1991 | | |
| 18–22 | Monday–Friday | Final examinations for Basic Colleges. |
| 25–30 | Monday–Saturday | Division A vacation. |
| April 1991 | | |
| 1 | Monday | Orientation and registration for transfer students, continuing freshmen, and returning upperclass students. |
| 2 | Tuesday | Orientation and registration and course drop/add continues until noon. |
| 3 | Wednesday | Classes begin in Basic Colleges for spring quarter, 8:00 A.M. |
| 15 | Monday | Patriots' Day. University closed. |
| May 1991 | | |
| 27 | Monday | Memorial Day. University closed. |
| June 1991 | | |
| 10–14 | Monday–Friday | Final examinations for Basic Colleges. |
| 15 | Saturday | Commencement. |
| 17–22 | Monday–Saturday | Division B vacation. |
| 24 | Monday | Registration for Divisions A and D and January freshmen (quarter three). Beginning of summer quarter. |
| 25 | Tuesday | Basic College classes begin for summer quarter, 8:00 A.M. |
| July 1991 | | |
| 4 | Thursday | Independence Day. University closed. |
| September 1991 | | |
| 2 | Monday | Labor Day. University closed. |
| 3–6 | Tuesday–Friday | Final examinations for Basic Colleges. |
| 9–18 | Monday–Wednesday | Division A vacation. |
| 12 | Thursday | Fall Commencement. |
| 16 | Monday | Beginning of 1991–92 academic year. Orientation week for new students. Registration and advising week for all returning upperclass students and all new students. |
| 19 | Thursday | Upperclass registration (Division A). |
| 23 | Monday | Classes begin in Basic Colleges for fall quarter, 8:00 A.M. |

Note: If calendar dates change, University personnel will be notified.

The Urban University

History



Located at the center of Boston's thriving educational and cultural life, Northeastern University is dedicated to excellence in research and scholarship and is committed to responding to individual and community educational needs. Since its beginning at the end of the nineteenth century, Northeastern has pioneered a wide range of educational programs and services for students of all ages.

Northeastern University is a nonsectarian institution of higher learning chartered and authorized to grant degrees under the General Laws of Massachusetts. The University is governed by a Board of Trustees elected by and from the Northeastern University Corporation, which is composed of more than 200 distinguished academic and professional leaders from around the country.

The story of Northeastern's growth constitutes a history of achievement and commitment to the spirit that shaped it. The University traces its roots to 1896, when the Boston YMCA established the Evening Institute for Young Men. Guided by the belief that the opportunity for a quality higher education should be available to all, the Evening Institute aspired to provide programs to address individual and

community educational needs. One of the first steps was to offer evening classes at reasonable cost for those who worked during the day.

On October 3, 1898, the Department of Law of the Evening Institute offered the first program at what was to become Northeastern University. Six years later, the Evening Law School was incorporated and given the authority to grant degrees in law.

The 1909 opening of the Cooperative Engineering School, an innovative project of the Evening Institute, exemplifies Northeastern's educational philosophy. In one of the earliest cooperative education experiments in the nation, the daytime program alternated classroom study with work experience. The Cooperative Plan of Education has since been expanded and adopted by all ten of the University's Basic Colleges as well as by many of its graduate programs.

In 1917, the then newly incorporated Northeastern College of the Boston YMCA—comprised of the Evening Law School, the School of Commerce and Finance, the Cooperative Engineering School, the Polytechnic School, and several affiliated schools—chose Frank Palmer Speare as its first president. Five years later, the College was renamed Northeastern University of the Boston YMCA. With the establishment of the College of Business in 1922, the University began acquiring land around Huntington Avenue to accommodate its rapidly expanding programs. Although Northeastern University moved toward financial and administrative independence during the 1920s and early 1930s, it was not until 1935—the same year the College of Liberal Arts was established—that the words “of the Boston YMCA” were dropped from its official name.

Carl Stephens Ell succeeded to the presidency in 1940. Three years later, women were first admitted to the day colleges. After World War II, the University continued to grow, accommodating large numbers of veterans under the G.I. Bill and establishing the College of Education.

In 1959, Asa Smallidge Knowles was inaugurated as Northeastern's third president. The next decade marked another period of expansion in the University's programs and facilities. University College was established, offering programs at the Huntington Avenue campus and at several satellite locations to better accommodate the needs of adult, evening, and part-time students.

The merger with the New England College of Pharmacy in 1962 led to the creation of the College of Pharmacy and Allied Health Professions. The University's interest in the health professions was reinforced in 1964 when the College of Nursing was established and Boston-Bouvé College, formerly Tufts University's Bouvé-Boston School, joined Northeastern. The late 1960s saw the founding of the College of Criminal Justice and the reopening of the School of Law.

Kenneth Gilmore Ryder, Northeastern's fourth president, was inaugurated in 1975. The early 1980s witnessed the merger of Boston-Bouvé College and the College of Education to become Boston-Bouvé College of Human Development Professions, the founding of the College of Computer Science, the creation of Network Northeastern (the live telecasting of engineering courses to high-technology corporations in the Boston area), and the development of the Alternative Freshman-Year Program and the University Honors Program.

On July 1, 1989, John Anthony Curry became the first Northeastern graduate to serve as its president. He has focussed the resources of the University on cultivating each individual student's academic achievement, career development, and social and intellectual growth. The opening in the fall of 1990 of a new library, the largest and most up-to-date academic library in Boston, signals the new president's commitment to academic excellence as Northeastern University approaches its centennial year.

The Boston Environment

One out of every five Massachusetts students chooses Northeastern University for his or her college education. In addition to its innovative system of cooperative education, Northeastern offers students access to the educational, cultural, professional, historical, and recreational resources of the Boston area. The University encourages students to explore these opportunities to the fullest.

The home of more than 60 colleges and universities, Greater Boston offers a profusion of academic activity. Within walking distance of Northeastern are the Massachusetts Institute of Technology, Boston University, Simmons College, Emmanuel College, Massachusetts College of Art, and Harvard Medical School. Also close by are Boston's world-renowned hospitals and their affiliated research facilities, where many students fulfill co-op requirements.

Located throughout metropolitan Boston, many of America's leading corporations and institutions provide Northeastern students with meaningful cooperative education experiences. Their offices and laboratories become classrooms for students participating in the world of work first-hand.

Among the hundreds of cultural attractions in Boston are the Museum of Fine Arts and Symphony Hall, both adjacent to the Northeastern campus. The museum provides free admission to its permanent collections and special exhibitions for more than 16,000 Northeastern undergraduates. Also neighbors of Northeastern are the Isabella Stewart Gardner Museum, the Institute of Contemporary Art, the New England Conservatory of Music, and the Boston Public Library. A short ride on mass transit brings students to the Museum of Science, the Hayden Planetarium, the New England Aquarium, and the theatre district. Northeastern's own *nuArts* performance series brings artists from all over the world to campus.

Best known as the birthplace of the American Revolution, Boston attracts thousands to the historical landmarks of its Freedom Trail every year. Among them are Paul Revere's House, the *U.S.S. Constitution* ("Old Ironsides"), Faneuil Hall, Beacon Hill, and the Boston Common. In recent years, a Harborwalk has introduced visitors to sites on the Boston Waterfront, including the Old State House and the Boston Tea Party Ship and Museum.

Boston revels in the competition of its professional sports teams—the Red Sox, Celtics, Bruins, and Patriots—and Northeastern students join in the excitement at Fenway Park, Boston Garden, and Foxboro Stadium. Each spring, the world's best runners gather to participate in the Boston Marathon. In addition, the Charles River and the slopes of northern New England tempt Northeastern students with some of the best crewing and skiing in the country.

The shops and restaurants of Boston's famous Quincy Market typify the city's blend of the historic and contemporary. Boston is the bustle of Haymarket and Chinatown, the grace of the State House and the Public Garden, and the striking architecture of Government Center, Copley Place, and the Christian Science Center. The John Hancock Observatory and the Prudential Skywalk, both a short walk from the Northeastern campus, offer excellent views of the city, old and new.

Campus Highlights

Northeastern University is located in a Boston neighborhood known for its many cultural and educational institutions. Symphony Hall (home of the Boston Symphony Orchestra), Horticultural Hall (home of the Massachusetts Horticultural Society), the New England Conservatory of Music, the Museum of Fine Arts, Simmons College, and the Isabella Stewart Gardner Museum are all nearby. The Fenway area, with its beautiful rose garden, bicycle and jogging paths, and Fenway Park, abuts the campus.

The campus comprises 52 buildings in an area of 55 acres. The buildings are organized in a formal grid, creating a series of landscaped courtyards and open corridor spaces. The vertical lines of the more centrally located buildings are the dominant theme of the campus architecture. A series of interconnecting walkways and secondary streets runs throughout the campus, linking the central academic area and dormitories as well as the athletic facilities and parking areas. A network of underground corridors connects many of the buildings, providing routes that are especially convenient during periods of inclement weather.

The front door to the campus is the Quadrangle, which faces Huntington Avenue, a major thoroughfare that divides the academic buildings in the southern portion of the campus from the dormitories in the north and provides convenient public transportation to downtown Boston and other areas of the city. In addition, the Quad is the location of Blackman Auditorium, site of many lectures and performances, and of the Ell Student Center, home of student clubs, offices, and study areas.

As the University has grown, renovations have been completed and new buildings have been added to the central academic area. The newest of these is the largest academic library in Boston, slated to open in the fall of 1990. Parking and recreational areas have been relocated on the periphery of campus.

Cullinane Hall, the University's oldest building, has been completely renovated and now provides a stimulating environment for the College of Computer Science.

Matthews Arena, located on the periphery of campus, is the oldest indoor ice hockey arena in the United States. With extensive renovations completed in 1983, it is now used for hockey and collegiate sports, men's and women's varsity basketball, and community athletics. It supplements the athletic and recreational facilities available to Northeastern students in the Cabot-Barletta field house, gymnasium, and swimming pool complex.

Another example of the University's development is the Snell Engineering Center, a building that accommodates the Departments of Industrial Engineering and Information Systems, Civil Engineering, Chemical Engineering, Mechanical Engineering, and the School of Engineering Technology. The Snell Center adjoins the Dana Research Center, home of the Departments of Physics and of Electrical and Computer Engineering, creating an impressive academic complex.

Serving as a second entry point to the campus, the relocated Orange Line of the MBTA has two stops convenient to Northeastern—the Massachusetts Avenue and Ruggles Street stations. The Ruggles Street subway station also coordinates local bus routes and a suburban commuter rail line.

Located at this new entrance is Ryder Hall, once a mill. Extensive renovation has provided general classrooms and studio space for the performing and visual arts and has significantly expanded administrative office space. Also in this developing area of the campus is a 995-car parking garage.

During the next five years, the University plans to build a new residence hall for undergraduate students, a recreation center, and additional facilities for engineering and the sciences.

Visitor Information

Hours

Monday–Friday 8:00 A.M.–6:00 P.M.

At the Visitor Information Center, 115 Richards Hall, staff members answer questions, give directions, and provide advice about the University and its programs to visitors, students, staff, and faculty. The University map, *Northeastern University Magazine*, *The Northeastern Voice*, and other Northeastern catalogs and brochures are available.

Visitors to Northeastern may request a University visitor pass entitling them to a number of special services and premiums, including an information kit, discounts at the University Bookstore and University events, complimentary posters, and free passes to the nearby Museum of Fine Arts.

A notary public is available at the center from 8:30 A.M. to 4:30 P.M., Monday through Friday.

For an up-to-the-minute recorded listing of University activities and events of interest to the University community and the general public, telephone the Northeastern University events line at 617-437-3281.

Undergraduate Admissions

Department of Undergraduate Admissions



| | | |
|---|--|--|
| 139 Richards Hall | Boston, MA 02115 | Telephone: 617-437-2200 |
| Philip R. McCabe, M.Ed., <i>Dean</i> | | |
| Mary A. Zammitti, M.Ed., <i>Associate Dean and Director</i> | | |
| <i>Assistant Directors</i> | <i>Assistant Director for International Students</i> | <i>Alumni Admissions Coordinator</i> |
| Steven B. Bissell, B.S. | Robert D. Hunter, M. Ed. | David G. Lister, M.Ed. |
| Karin I. Brond, M.Ed. | | |
| Michael F. Clifford, B.S. | <i>Admissions Counselors</i> | <i>Coordinator of Student Volunteer Programs</i> |
| Michael C. Perry, M.Ed. | Jerry D. Bolnick, B.A. | Lynne A. Shaughnessy, M.Ed. |
| Barry C. Reckley, B.S. | Sophia K. Schueler, B.A. | |
| | <i>Admissions Fellow</i> | |
| | Beverly A. Brennan, B.A. | |

One of the main goals of the college applicant is to find a place finely tailored to personal needs and professional interests. Northeastern University is such a place. The Committee on Admissions extends a cordial welcome to all prospective freshmen and transfer students and offers several forms of introduction: a campus visit; talking with alumni, faculty, and students; and studying college publications, videos, or PC diskettes.

The campus visit ranks high on the list, and the University has planned a series of events to make such a visit eminently worthwhile.

■ The Admissions Conference

Students have many questions about Northeastern—its programs of study, its support services, and the Cooperative Plan of Education. For this reason, the Committee on Admissions sponsors a series of orientation conferences to help applicants become better acquainted with the University. Scheduled at 10:00 A.M. and 2:00 P.M. on Mondays and Fridays from October 1 through May 1 (except for legal holidays) and usually offered throughout school vacation periods, these conferences include presentations by an admissions counselor, an informal question-and-answer period, and a multimedia presentation.

Special sessions are also held in the fall on Saturday mornings and in the summer between July 1 and September 1. For more information, contact the Department of Undergraduate Admissions.

■ Guided Tours

Student-guided tours of the campus are usually held daily, Monday through Friday, at 11:00 A.M. and 3:00 P.M. and in the fall on Saturday mornings. Both the admissions conference and the tour should be scheduled in advance by writing or calling the Department of Undergraduate Admissions.

The opportunity to visit the University's facilities and to observe student life on campus is one important way to learn about Northeastern. To set up a conference or tour, telephone 617-437-2211.

■ The Interview

Although not required, a personal interview is generally regarded as an appropriate opportunity for students with special questions to meet with an admissions counselor. In studying a secondary school record, the counselor may discover some factor that merits further explanation. In this event, the applicant may be asked to arrange a visit to the Department of Undergraduate Admissions. The interview may be held at the request of the student or the counselor. Contacts with admissions personnel will be more beneficial if the *Northeastern University Bulletin* has been read carefully before the personal interview.

■ College Visit Program

Prospective students and their parents have the opportunity to visit any one of the basic undergraduate colleges and schools through the College Visit Program. Students are taken on a tour of the facilities and learn first-hand about the college's academic programs by meeting informally with the faculty, administrators, and current students. The College Visit Program is scheduled so that visiting students and their parents may also participate in the Admissions Conference and University Tour on the same day.

■ Open Houses

During late winter and early spring, each of Northeastern's undergraduate colleges invites prospective students and their parents to an Open House. These informal meetings provide an overview both of the University and of the individual colleges. Students are able to meet members of the faculty and student body to learn more about academic program offerings and to tour the campus and facilities.

At the Open House meetings, representatives of various University departments provide a variety of information about admissions, cooperative education, financial aid, residential life, career development and placement, and student activities. The representatives are happy to answer any questions that students and their parents might have.

■ Prospectuses

The Department of Undergraduate Admissions produces a prospectus for each of the undergraduate colleges. Designed to present prospective students with a comprehensive picture of an individual college, these publications are also a graphic illustration of the University's unique integration of academic study and cooperative education assignments.

Information about academic programs and major areas of concentration, cooperative education opportunities and employers, admissions procedures, University resources and activities, and the campus and Boston environment is provided in these publications.

■ Videocassettes

In addition to providing students with printed material describing Northeastern's academic programs, the Department of Undergraduate Admissions has produced a series of videocassettes that are available to prospective students upon request. The videocassettes offer a general introduction to the University as well as an overview of each of the undergraduate colleges.

Many high schools and junior colleges have a copy of the Northeastern University Introductory Videotape. The University is also a member of the Learning Resources Network. Students are encouraged to consult with their guidance office or career center about the availability of the introductory videotape.

■ Computer Diskettes

Computer diskettes are available to prospective students upon request. Capsule information about admissions, academic programs, cooperative education, financial aid, housing, and student activities is provided in a concise format. The diskettes are compatible with most personal computers used in schools or homes. Students need only provide the computer make and model to receive a diskette.

Many high schools and junior colleges have received a copy of the Northeastern Information Diskette. Students should consult with their schools about the availability of the information diskette.

General Requirements for Entrance

An applicant for admission to Northeastern University has, ideally, completed an academically challenging secondary school program—one that includes courses in English, mathematics, laboratory science, history, and a foreign language. Today, proficiency in a foreign language is especially important for applicants interested in study or cooperative placement abroad. In addition to indicating achievement in subjects critical to university studies, an applicant's overall record can reflect a wise choice of electives and serve as clear evidence of sound study habits. Candidates should also have read broadly outside of class and developed an ability to communicate ideas effectively.

Today's high school students have had the advantage of many innovations that have greatly enriched their experience—independent study, computer programming, small-group seminars, research projects, and off-campus experiences related to community service or future vocations. Northeastern is interested in the growth of the work-study concept in many secondary schools, and the Committee on Admissions looks favorably on the variety of these worthwhile experiences.

■ Learning Disabilities

Students self-identified as learning disabled are responsible for providing additional information regarding their learning disability. Nonstandard administration of the SAT is acceptable under these circumstances.

■ Preparation for Engineering, Computer Science, Sciences and Mathematics, and Allied Health Professions

Evidence of special aptitude and the highest possible level of preparation in the sciences and mathematics is required for entrance into the following programs of study:

College of Arts and Sciences

Biology, Chemistry, Geology,
Environmental Geology
Mathematics, Physics,
Applied Physics

Boston-Bouv  College of Human Development Professions

Athletic Training
Cardiovascular Health and Exercise
Physical Education Teacher Preparation
Physical Therapy
School and Community Health Education

College of Computer Science

Bachelor of Science program

College of Engineering

All programs

School of Engineering Technology

Bachelor of Engineering Technology program

College of Nursing

Bachelor of Science program

College of Pharmacy and Allied Health Professions

All programs

Applicants are encouraged to complete a full sequence of science and mathematics courses if possible. In science, such a sequence usually includes a full academic year of study and laboratory work in biology, chemistry, and physics; and, in mathematics, geometry, Algebra I and II, and a fourth year of trigonometry and/or analysis. Applicants to programs emphasizing mathematics and science also need courses in the social sciences and humanities to be fully prepared for advanced study.

■ Preparation for Study in Business Administration

Candidates for study in this diversified discipline must have completed a strong preparatory program in high school that emphasized the humanities, social sciences, and natural sciences. Applicants must also have had several years of mathematics, including geometry and Algebra I and II.

■ Preparation for Study in the Arts and Humanities, the Social Sciences, Teaching, and Criminal Justice

Candidates for admission who have enjoyed their greatest success in the study of the humanities and social sciences may choose to apply for admission to one of the following programs.

College of Arts and Sciences In addition to the science programs listed, the college offers programs in the arts and humanities with majors in art (including concentrations in architecture and visual and media design), theatre and dance, English, modern languages (French, German, Italian, Russian, and Spanish), music (including a concentration in music industry), philosophy, and speech communication; and programs in the social sciences with majors in anthropology, African-American studies, economics, history, human services, linguistics, political science (including a concentration in public administration, and law and legal issues), psychology, and sociology. The School of Journalism is a unit of the College of Arts and Sciences. Journalism students have the option of concentrating in advertising, newspaper/print media, public relations, or radio/television news.

Boston-Bouvé College of Human Development Professions Students seeking certification as teachers in early childhood education or elementary education or those majoring in human services or recreation management should have demonstrated interest in the behavioral and social sciences through their high school courses.

College of Criminal Justice By its very nature, the program in criminal justice requires a strong base of liberal arts study before professional courses are introduced. Applicants for admission should, therefore, have demonstrated the ability to succeed in their study of the behavioral, social, and human sciences.

■ Entrance Examinations (Freshman Applicants)

Research indicates that the best single predictor of college academic success is achievement in secondary school. This factor, together with recommendations from the school counselor, weighs most heavily in the evaluation process. Although the Scholastic Aptitude Test and three achievement tests of the College Board are required, they are only one factor in the admissions process. The Committee on Admissions recognizes that these test results do not measure such qualities as determination, imagination, and leadership.

English composition is one of the three required achievement tests. Students may choose the other two tests in subjects in which they feel most confident. Students whose native tongue is not English should substitute the Test of English as a Foreign Language (TOEFL) for the English composition test. No single schedule of testing is recommended, but applicants are advised to take subject matter tests while studying those subjects.

For more information about College Board Examinations, consult a school guidance counselor or write directly to The College Board, P.O. Box 592, Princeton, NJ 08540 or P.O. Box 1025, Berkeley, CA 94701. The American College Testing Program may be substituted for the College Board Testing Program. For more information, write to American College Testing Program, P.O. Box 168, Iowa City, IA 52243. Admissions counselors also will be glad to answer questions about these testing programs.

To meet admissions criteria, applicants with disabilities may make alternative testing arrangements.

■ Advanced Placement

The University grants advanced placement credit to those applicants with a score of 3 or better in their advanced placement examinations. Applicants may take the examinations in the following subjects: art (history, studio—general, studio—drawing), biology, chemistry, computer science (A, AB), economics (microeconomics, macroeconomics), English (language, literature), French (language, literature), German (language), government and politics (comparative, United States), history (European, United States), Latin (Virgil, Catullus-Horace), mathematics (calculus AB, BC), music (listening-literature, theory), physics (B, C mechanics—C electricity, magnetism), and Spanish (language, literature).

Applicants who wish to submit scores for advanced placement are required to take the Advanced Placement Tests of the College Board in May.

■ College-Level Examination Program

The University cooperates with the College Board in its College-Level Examination Program. CLEP provides a national program of 5 general examinations and 30 subject examinations to evaluate nontraditional college-level education. Qualified students are encouraged to take the general and/or subject examinations of CLEP so that college credit may be allowed upon entrance. In general, the Committee on Admissions accepts the score range recommendations of the College Board. Northeastern University has been designated a CLEP Testing Center. For more information, contact the Counseling and Testing Center at 302 Ell Student Center, 617-437-2142.

Admission

■ Entry Dates

Northeastern University admits qualified freshmen to all programs in September and January. Entrance dates for transfer students vary by program; many admit students at the beginning of each quarter.

The application should be filled out properly, signed, and forwarded to the Dean of Admissions, 139 Richards Hall, Northeastern University, Boston, MA 02115, together with a nonrefundable \$30 application fee. Checks should be payable to Northeastern University. This fee may be waived in cases of extreme hardship as endorsed by the candidate's secondary school counselor or social worker. It is to the student's advantage to submit the application for admission promptly. Students are also responsible for making sure that their transcripts and College Board scores are submitted to the University.

■ Program Selection

Because many have difficulty in selecting a program of studies, the University allows students to explore alternative fields or tailor their programs to personal goals. Freshmen must indicate a choice of college and, in some cases, a major. In most colleges, students do not have to make a definite choice of major, concentration, or emphasis until the end of the freshman year. In some programs, the decision may be delayed until the end of the sophomore year. Students are provided with additional assistance in planning their major through experience gained by participating in the Cooperative Plan of Education.

■ **Rolling Admission Plan**

Under Northeastern's Rolling Admission Plan, decisions on admission are made as soon as all of the required credentials (including first-marking-period senior grades and College Board test scores) have been submitted and reviewed. In all cases of acceptance, candidates must complete their senior year of high school.

Students should note that enrollments are limited in some programs in which the number of applications is expected to exceed campus resources.

■ **Deferred Admission Plan**

Accepted students who wish to participate in the Deferred Admission Plan will be asked to describe the activities they plan for the year preceding enrollment. Students may choose this plan for a variety of reasons, such as travel, health problems, or work.

■ **Early Admission — Juniors, Second-Semester Seniors**

In certain cases, students may enroll at Northeastern prior to high school graduation. Such students may enroll either in September or in January, thereby reducing the time to complete degree requirements by one year. A special form provided by the Committee on Admissions requires the endorsement of the school principal or guidance counselor for early admission.

■ **Community Financial Aid Grant Programs**

To supplement student earnings from cooperative education experiences and the University's regular student financial aid program, Northeastern has established a number of special community grant programs for disadvantaged students. In all cases, students have to be accepted for admission and complete the University's application procedure for financial aid (see page 36 for complete details) to qualify for one of the special community grant programs. For more information, write to the Department of Undergraduate Admissions.

■ **College of Arts and Sciences Degree Programs**

College of Arts and Sciences students may choose the five-year Cooperative Plan of Education or elect to enroll in a traditional four-year degree program without co-op.

■ **Four-Year Co-op Option**

College of Engineering and College of Computer Science students who wish to complete their undergraduate degree in four years may elect to enroll in the Four-Year Co-op Option. In order to participate, students must meet the program criteria and follow a prescribed schedule of academic and co-op quarters.

With a curriculum identical to the five-year program, the Four-Year Co-op Option provides students with four, rather than seven, quarters of cooperative education experiences at leading high-technology and engineering corporations across the country and around the world. Average co-op earnings depend on the number of quarters students spend on cooperative education.

■ **Alternative Freshman-Year Program**

The Alternative Freshman-Year Program was developed in collaboration with University College, a division of Northeastern serving students who seek a flexible course schedule. This degree-track program is often ideal for those students who feel that their high school grades and/or test scores do not reflect their true abilities. It can serve as a means of re-entry into more traditional college programs.

This program is structured to assist students in making the academic and social adjustments necessary for success in college. Working with a counselor, students

follow a prescribed curriculum designed to meet their individual needs and to help sharpen their skills in writing, mathematics, and reading comprehension; at the same time they gain confidence in their ability to do college-level work. In addition, the program permits students to sample different areas of study before committing themselves to a specific major.

Students who have applied for regular admission to the University and whose credentials do not indicate success in the traditional freshman year programs may be provided the opportunity to begin their University experience by entrance into this program.

The full range of counseling services, physical education facilities, and extracurricular programs is generally available to students enrolled in this program. For more information about the Alternative Freshman-Year Program, see pages 190–192.

■ **Open Campus Courses**

Under Northeastern University's Open Campus Plan, qualified high school students are invited to take full-credit courses at Northeastern while still enrolled in secondary school. Such students can gain a better idea of the collegiate environment while they work toward college credit. For more information, write to the Department of Undergraduate Admissions.

■ **Orientation and Registration**

The orientation and registration program officially launches each student's academic career at Northeastern.

The administration, faculty, and many upperclass students have planned several days of programs, faculty seminars, meetings, and special events designed to help new students adapt to college life at Northeastern.

In addition to participating in regular registration operations, choosing courses, receiving class schedules, and purchasing books, new students meet with the dean and faculty members of their college, who provide information about academic majors, courses, and careers.

The University is keenly aware that the transition from high school or junior college continues in a variety of ways during the first year on campus. Faculty advisers are available for consultation on both academic and personal concerns (see Resources and Support Services, beginning on page 213). The University helps acquaint students with the Greater Boston area by making available guided tours to some of Boston's historical and cultural centers. It also offers a series of seminars on how-to's (how to study successfully, be assertive, make friends), peer counseling, public safety, and student organizations. The Department of Cooperative Education, for example, plans meetings on job opportunities and school-work experiences, and there are nearly 150 organizations to join (see page 229). In addition, a number of colleges and programs have developed a student mentor service to assist students needing help with transitions to urban life, the Cooperative Plan of Education, or being a University scholar.

■ **Skill and Competency Development**

Responding to a growing national concern for the improvement of basic writing, numerical, and reading/study skills, the University extends to freshmen in several of its participating colleges the opportunity to enhance the likelihood of academic success through enrollment in compensatory courses.

Selection for such course work is based on the correlation of competency data, derived from specifically prepared testing procedures administered on campus, with pre-college academic credentials.

The freshman-year writing sequence, the mathematics sequence, and Reading/Study Skills each bears full credit in participating colleges (see page 198).

Instructors, freshman advisers, and the Student Affairs staff of each college are ready to assist involved freshmen in achieving success in their endeavors.

■ **English-as-a-Second-Language Proficiency Requirement**

Before being considered for admission, students whose native language is not English are required to demonstrate some English language proficiency. This can be done by submitting the results of the College Board's Test of English as a Foreign Language (TOEFL), by successfully completing an approved English-as-a-second language course of study, or by being currently enrolled in such a course.

Before they are allowed to enroll in academic course work, all students whose first language is not English are required to take the English Proficiency Test administered by the University's English Language Center. This requirement applies to all non-native speakers.

The results of this test are used to assign students to appropriate English courses. Students with minimal English language skills are assigned to a noncredit intensive English course. The level of course work required will determine the student's academic schedule.

■ **Special Students**

A limited number of special students may be admitted to the Basic Colleges. Special students are not degree candidates and must meet criteria set by the college to which they are admitted.

Those admitted as special students usually have completed some college-level work. The following are among the applicants who may be considered:

- college or university graduates who need additional course work to prepare or qualify for a graduate program;
- individuals, recommended by deans or program directors, who need particular formal course work to meet professional requirements for certification;
- students who need several courses to complete degree requirements at another college or university, provided they have written approval from the appropriate college dean; others who are recommended by deans of the colleges to take courses leading to regular admission. In such cases, special-student enrollment should be limited to one academic quarter.

All special students will be charged a nonrefundable application fee of \$30. Before obtaining and paying for an application, the prospective special student should consult a counselor in the office of the dean of the college offering the course(s) desired. Tuition will be at the quarter-hour rate in effect at the time and must be paid before registration is valid. Special students will be admitted to classes only when space is available. All special students must obtain approval from the office of the dean of the Basic College in which they wish to enroll prior to each quarter's registration, but they will be required to pay the application fee only once.

■ **University Honors Program**

The University offers qualified students in each of its Basic Colleges the opportunity to participate in a comprehensive honors program designed to foster and recognize superior intellectual development and achievements. Based on criteria established by an individual college for its own majors, students may be invited into the program as they enter the University or at any point during their college careers. Students may also be recommended for participation in the program or in its individual

components by their faculty advisers and/or the honors committee of their college.

The program consists of both academic and nonacademic components. Various special limited-enrollment sections of many first- and second-year required and elective courses are offered each quarter, providing greater depth, sophistication, or extension than their regular equivalents. Once completed, these more challenging courses may be used to fulfill specified curricular requirements or may serve as electives.

Certain other courses have been organized to permit students to undertake individual advanced-level work and to receive an honors designation on their transcripts.

In addition, a selection of honors seminars is offered on interdisciplinary subjects for which honors students may enroll as part of their course load or as a free overload. Junior-senior honors programs, based on individual or small-group research projects under the direction of distinguished faculty, are available to qualified students.

Successful completion of any honors course is noted clearly on students' individual transcripts, and successful completion of the program's various academic requirements can result in Honors Program Distinction at graduation. The program makes some extra demands on participating students, but the smaller and more homogeneous class composition, the heightened levels of student-faculty interaction, and challenging intellectual content make the University Honors Program a stimulating educational opportunity. (For quality-point equivalents of honors, see page 49.)

Beyond the courses, honors students may avail themselves of a wide variety of opportunities and services. These include eligibility for university honors scholarships; a special liaison with the Department of Cooperative Education; honors housing options; honors faculty advisers; individualized course selection and registration privileges; an honors lounge and computer-equipped study area; and a range of social and cultural activities, including speakers and film series, colloquia, and excursions of various kinds.

For more information concerning freshman entry into the program, please contact the Department of Undergraduate Admissions. For information concerning the college's criteria for upperclass entry into and retention within it, contact the University Honors Program, 213 Lake Hall, Northeastern University, 360 Huntington Avenue, Boston, MA 02115, or telephone 617-437-2333.

■ **Carl S. Ell Presidential Scholarship Program**

The Carl S. Ell Presidential Scholarship Program was established both to provide recognition to some of the University's finest incoming students and to foster the continuation of their superior academic performance.

Each year a limited number of freshmen who have records from high school that exhibit exceptional promise are selected for this academic achievement award. Criteria for selection include high school records indicating a college preparatory program, class rank, grade-point average, extracurricular activities, community service, letters of recommendation from guidance counselors, and College Board test scores.

The Ell Scholars are awarded full freshman-year tuition scholarships. Those who continue to maintain a superior scholastic average and to make a strong contribution to the University's academic and social life during their upperclass years at Northeastern are awarded one-half tuition grants for each subsequent year.

In addition to the awarding of financial assistance, the scholars are provided with a number of opportunities to engage in intellectual exchange on campus, including an invitation to join the Ell Scholars Association, an organization that endeavors to build a community of scholars within the University.

The application deadline for the program is January 1. In most cases, students are notified of their selection as Ell Scholars before February 1.

■ **Bachelor of Arts or Bachelor of Science/Juris Doctor Degree Program**

Northeastern offers a unique joint degree program for aspiring lawyers—the eight-year Bachelor of Arts or Bachelor of Science/Juris Doctor Degree Program. Each year the University admits a limited number of highly qualified freshmen into the five-year undergraduate portion of the program.

To be eligible to continue with the three-year law school portion of the program, students must successfully complete their undergraduate course of study, graduate in the top 15 percent of their class, and score in the top 20 percent of the Law School Aptitude Test (LSAT).

Students who are accepted into the program and who meet the above criteria will be qualified to continue their studies at Northeastern University School of Law. Unique among American law schools, Northeastern University School of Law features cooperative legal education—the blending of legal apprenticeship with intensive academic study. For more information, please contact the Department of Undergraduate Admissions.

■ **Five-Year Cooperative Education**

Bachelor of Science/Master of Science Joint Degree Program in Engineering

Qualified high school students committed to reaching a high level of success in engineering can now accelerate their progress by entering directly into the Five-Year Cooperative Education Bachelor of Science/Master of Science Joint Degree Program. This full-time program allows honor students to earn both degrees in five years, and at the same time gain extensive on-the-job experience through the Cooperative Plan of Education.

The B.S./M.S. program is offered by three departments: Electrical and Computer Engineering, Industrial Engineering and Information Systems, and Mechanical Engineering. The program incorporates cooperative education, thereby enabling students to alternate periods of academic work with paid employment in their chosen career field.

Students generally take five courses per quarter and must maintain a 3.2 quality-point average to continue in the program. All students begin with a basic curriculum that includes calculus, physics and labs, computer programming, and chemistry. At the same time, study of the social sciences and humanities broadens their awareness and understanding of the spheres in which they will practice their professions.

Programs for Minority Students

Northeastern University is committed to expanding educational opportunities for minority students of high academic promise and to enrolling a student body that reflects the diverse ethnic and social composition of our society.

To ensure that minority students have the greatest opportunity for success, the University's African-American Institute provides tutorial, counseling, and academic services. Each spring, the institute holds an open house for prospective students.

■ **Dr. Ralph J. Bunche Scholars Program**

Northeastern honors the late Dr. Ralph J. Bunche, Nobel Peace Prize laureate and former undersecretary of the United Nations, by awarding ten Ralph J. Bunche Scholarships annually to African-American students who have compiled outstanding records of academic achievement and leadership. The Bunche awards are full-tuition scholarships in the freshman year and half-tuition grants in the remaining years of study, provided that the student maintains a superior scholastic average.

Students who believe that they qualify for this award may obtain information and application materials from the Department of Undergraduate Admissions.

■ **Project Ujima**

Project Ujima is an academic support program designed to assist minority students who have demonstrated an ability to succeed in college but who need additional academic assistance, particularly in their freshman year.

The Ujima program provides participants with a variety of support services to develop their academic skills and to foster the growth of a positive attitude toward learning throughout their years at the University. Counseling, peer mentors, tutorials, a reading and study skills course, and educational workshops are examples of some of the supportive activities sponsored by the project. Project Ujima is an academic component of the African-American Institute.

Admission of International Students

The University welcomes qualified students from other countries who are fully prepared to benefit from the educational, cultural, and social opportunities it has to offer. At present, more than 2,000 international students from over 100 countries attend Northeastern.

Most international students participate in the University's Cooperative Plan of Education. Co-op, as it is commonly called, is a unique five-year program that combines outstanding academics with paid professional career training. Students in the College of Computer Science or the College of Engineering may elect to participate in a Four-Year Co-op Option. Students in the College of Arts and Sciences may petition to complete their degree in four years without co-op.

■ **Basic Requirements**

International students must submit the undergraduate application for admissions, including the Supplementary Form for International Applicants, according to the following schedule:

| Entrance date | Application deadline |
|---|-----------------------------|
| Fall quarter (freshmen and transfer applicants) | May 1 |
| Winter quarter (freshmen and transfer applicants) | September 1 |
| Spring quarter (transfer applicants only) | December 1 |
| Summer quarter (transfer applicants only) | March 1 |

Applicants from other countries are required to submit the same credentials as U.S. citizens (see pages 13–15). All credentials must be official documents or certified true copies. Credentials in languages other than English must be accompanied by certified literal English translations. Applicants with previous university-level studies are advised to submit official course descriptions or syllabi for all course work completed to facilitate the evaluation of transfer credit.

After notification of acceptance, students must submit the required tuition deposit and the university's Declaration and Certification of Finances Form by the date specified on the acceptance certificate before a Certificate of Eligibility (I-20 form or IAP-66 form) can be forwarded.

Northeastern University is authorized under federal law to enroll nonimmigrant aliens as full-time students in degree-granting programs.

Students seeking information, such as an application and a copy of the international student admissions prospectus, should contact the Department of Undergraduate Admissions.

■ **Advanced Standing Credit for Secondary School Graduates**

The University considers awarding advanced standing credit to students whose secondary school education clearly exceeds the requirements met by students in the American educational system. Inquiries about this should be directed to the Department of Undergraduate Admissions.

■ **Credit for the International Baccalaureate**

The University recognizes the advanced level of academic preparation offered by the International Baccalaureate. Up to one year of credit is generally granted for scores of 5, 6, or 7 on higher level examinations, as applicable to the degree being pursued.

■ **Ambassador Awards**

The University offers five half-tuition scholarships to non-U.S. citizens for the freshman year (three academic quarters—September through June). These scholarships are awarded to individuals who are studying outside the United States and whose credentials provide evidence of exceptional academic achievement. The Ambassador Awards are given to freshmen enrolled in a full-time academic program; these awards are not renewable.

Admission of Transfer Students

Students wishing to transfer to Northeastern may request advanced standing credit as upperclass students on the basis of acceptable credits earned in an accredited two- or four-year institution or a technical institute. In addition, Northeastern University participates in the Advanced Placement program as administered by the College Entrance Examination Board. The University grants credit for such courses in which a score of 3 or better has been attained. Students may also receive advanced standing credit for satisfactory performance through the College Level Examination Program (CLEP). In general, a score of 500 or better (general examinations) and a score of 50 or better (subject examinations) are required on any CLEP test to receive credit at Northeastern University.

■ **Basic Requirements**

Candidates applying for transfer to Northeastern University must have achieved a satisfactory college record, appropriate to the course of study they wish to pursue, at another institution. Credit is generally granted toward a Northeastern degree for a grade of C or better in any reasonably equivalent course completed at another accredited institution. Candidates must be in good standing and must be eligible to continue in the institution they are currently attending.

■ **Application Procedure**

Transfer candidates must do the following:

- complete an application for admission form and forward it with a nonrefundable fee of \$30 to the Department of Undergraduate Admissions—all transfer candidates are required to indicate their choice of college and major on the application;
- submit an official transcript of their high school record;
- request that an official transcript from each college attended be sent to the Department of Undergraduate Admissions directly from the Registrar's Office of the respective colleges. A listing of courses in progress for the current academic year (including course number, course title, and number of credits to be earned in each course) should also be forwarded.

Special Note Transfer candidates are not required to complete entrance examinations.

| Entrance date | Application deadline |
|----------------|----------------------|
| Winter quarter | November 1 |
| Spring quarter | February 1 |
| Summer quarter | May 1 |
| Fall quarter | July 1 |

The Test of English as a Foreign Language (TOEFL) is required for transfer candidates whose native language is not English. International students must obtain authorization from the Immigration and Naturalization Service to transfer from one school to another. Please refer to pages 21–22 for complete information for international students.

■ Orientation and Registration

All transfer students are required to participate in an orientation and registration program. This five-day program, which is scheduled immediately before the beginning of classes, provides transfer students with the opportunity to meet with their faculty advisers and plan their course schedules. They also meet with members of the Division of Student Affairs and with representatives of the Department of Cooperative Education.

Students should bring a copy of their official Certificate of Acceptance to the orientation and registration program. In most cases, the certificate lists each course (and its credit value) for which the transfer student has received credit. The total number of credits being received is also listed on the certificate.

Students receive full transfer credit only for courses that are listed on the Certificate of Acceptance and for which a grade has been recorded on an official transcript from their former college(s).

Transfer credit from other institutions is not computed into the Northeastern University quality-point average.

Northeastern University uses the quarter calendar and awards quarter hours of credit for courses that are successfully completed. Each quarter hour of credit is equivalent to three-quarters ($\frac{3}{4}$) of one semester hour. Most Northeastern courses are equivalent to three (3) semester hours of credit or four (4) quarter hours.

In general, students who successfully complete 48 quarter hours will usually qualify for sophomore standing, 80 for middler, 112 for junior, and 148 for senior. All upper-class course selection for transfer students is planned with their faculty advisers.

Additional information about transfer policies and procedures may be obtained from the Department of Undergraduate Admissions.

Deposits Required from Freshmen and Transfer Students

If the Committee on Admissions makes a favorable decision on a student's application, the student is asked to submit a nonrefundable tuition deposit of \$100 by May 1. This deposit indicates intent to enroll and is applied to the first-quarter tuition account. Students applying for entrance dates other than September should note the required deposit date on their certificates of acceptance.

Students interested in on-campus housing must submit a nonrefundable \$400 deposit along with a completed housing application form to complete the housing application process. Information about this required nonrefundable deposit is mailed by the Department of Residential Life to all students accepted for admission following receipt of the tuition deposit by the University's Bursar. For more information and instructions, see the Housing section, pages 41–46.

General and Special Health Requirements

The Lane Health Center's Pre-entrance Physical Examination Form is sent to each student following acceptance at Northeastern. This form is considered a condition of admission. Each applicant must return the completed form, which includes a medical history, documentation of a recent physical exam, and a tuberculin test within six months of registration.

State law requires medical documentation of appropriate immunization against measles, mumps, rubella, tetanus, and diphtheria. In accordance with public health guidelines, Northeastern now requires documentation of two measles immunizations. A rubella titre is mandatory for the health professions (Medical Laboratory Science, Nursing, Pharmacy and Allied Health Professions, Radiology, and Physical Therapy). Tuberculin tests are required annually for nursing students and within three months prior to the practicum for student teachers. Junior-year physical therapy students will have a repeat physical exam performed at the Lane Health Center.

In accordance with Section 504 of the Rehabilitation Act of 1973, applications for admission are judged on the basis of qualification and not on the absence or presence of a medical or disabling condition. Any necessary adjustments for such applicants are readily made to ensure access to college life, both academic and extracurricular.

Cooperative Education

An Education That Works



Cooperative education is based on the principle that what students learn in the workplace is just as valuable as what they learn in the classroom. By combining work and study, students gain greater insight into each.

At Northeastern University, cooperative education is given such a high priority that it is considered a degree requirement for most programs. The University assists students in planning and structuring cooperative work experiences. It also attempts, whenever possible, to integrate students' work experiences into their academic work. But the University cannot do it alone. A student's interest and enthusiasm play a crucial role in determining the quality of cooperative education experiences. The success of the program, then, depends upon the cooperation of educators, students, and outside agencies to produce an integrated and relevant program.

Studies have shown that the reinforcement of classroom learning with job responsibilities increases a student's motivation and self-confidence. Greater interest in academic work develops when students see the relationship between co-op work and the principles they study in the classroom. Not only are co-op students able to

evaluate career decisions early in their college years, but they also gain meaningful work experience before graduation and establish professional contacts and references.

Finally, the salaries students earn while gaining cooperative education experience help defray tuition, room and board, books, and other expenses.

Department of Cooperative Education

Paul M. Pratt, M.Ed., *Dean*

Kathleen Sharkey-Jordan, M.Ed., *Assistant Dean*

Robert E. Vozzella, Ed.D., *Professor and Director, International Cooperative Education*

Nancy A. Gaffney, M.P.A., *Assistant to the Dean*

Patricia A. Venter, B.S., *Minority Liaison*

Professors

Nancy J. Caruso, M.Ed.

Robert W. Miller, M.Ed.

Associate Professors

Boreslaw P. Berestecky, M.Ed.

Betsey W. Blackmer, P.T.,
Ed.D.

Richard L. Canale, M.Ed.,
C.A.G.S.

Elizabeth A. Chilvers, M.Ed.

Mark I. Conley, Jr., Ph.D.

Robert D. Deforge, R.Ph.,
D.Ph.

Kathleen L. Finn, R.N., Ed.D.

Mary R. Flynn, R.N., M.Ed.

Stephen M. Kane, Ed.D.

Judith A. Moll, M.S.

Ann C. Noonan, P.T., Ed.D.

Anthony R. Rotondi, M.Ed.

Melvin W. Simms, Ed.D.

Hugh J. Talbot, M.P.A.

Robert R. Tillman, Ed.D.

Assistant Professors

Michael A. Ablove, M.Ed.

Terry H. Chapman, Ph.D.

Donald L. Eastridge, M.Div.

Joyce K. Fletcher, M.Ed.

Ann M. Galligan, Ed.D.

Theresa A. Harrigan, Ed.D.

John C. Mulhall, M.S.

Veronica L. Porter, M.Ed.

John A. Saltmarsh, Ph.D.

William A. Sloane, M.B.A.

Donna R. Smith, M.A., M.Ed.

Gary M. Somers, M.A.

Russell A. Straub, B.S.

Lecturers

Patricia G. Brigham, M.B.A.

Barbara L. Elderkin, M.Ed.

William Rodriguez, M.S.

Martha L. Wengert, M.Ed.

The Department of Cooperative Education administers the cooperative education programs for all undergraduate programs in the Basic Colleges and the graduate programs in engineering.

Participation in the Cooperative Plan of Education is required of all students in the Basic Colleges except those in the College of Arts and Sciences. Although most Arts and Sciences students choose to take advantage of co-op, the college offers a full-time program in which eight quarters of upperclass study may be completed in three years.

Cooperative education curricula leading to the baccalaureate degree generally require five years at Northeastern University. Programs typically consist of a freshman year of three consecutive quarters of full-time study followed by four upperclass years in which students alternate periods of classroom attendance with cooperative education experiences. The College of Engineering and the College of Computer Science offer a Four-Year Co-op Option. (See pages 131, 135 and 141.)

Students are assigned a faculty coordinator/counselor team that is responsible for all phases of the cooperative program and assists them in deriving greater value from their education at Northeastern. Personal interviews provide the basis for referral to specific opportunities that help students realize career objectives. The Department of Cooperative Education keeps abreast of activities in specific areas in order to provide counseling on opportunities and trends. In general, co-op experiences can become increasingly challenging and career-specific as the students' education and abilities grow.

Students may wish to participate in an activity other than paid employment during a cooperative period. They may wish to travel abroad, to do volunteer work, or to take specialized courses at another institution. Students may arrange time for these special activities with their coordinators.

Further details on the cooperative program are available in *Cooperative Education*, a booklet the Department of Undergraduate Admissions will be happy to send you on request.

International Cooperative Education

Robert E. Vozzella, Ed.D., *Director*

The Office of International Cooperative Education offers a wide variety of services to both international students and students from the United States. Through the International Exchange Program, qualified undergraduates are afforded the opportunity to be placed abroad for their cooperative work experience. Placements abroad are currently available in the United Kingdom, Ireland, France, Germany, Austria, The Netherlands, Sweden, Australia, and Israel for students whose academic, linguistic, and professional experience make them appropriate candidates.

International students may receive assistance on matters relating to their co-op employment, such as Social Security and tax information, as well as issues involving the verification of their immigration and co-op status.

The course "Working in the United States," created expressly to meet the needs of undergraduate international students, is taught by the staff of the Office of International Cooperative Education. It is designed to assist such students in competing more effectively for domestic cooperative education positions and to facilitate their cultural adjustment into the American work force.

New co-op programs are also being developed in some of the home countries of international students where the economic and social conditions permit such undertakings. Limited opportunities with various multinational corporations (primarily those having operations in the Asia/Pacific Region) are available for international students majoring in engineering, computer science, and business administration.

College Expenses

Tuition and Fees



Tuition rates, room-and-board charges, and fees are subject to revision by the Board of Trustees at any time. All registered Basic College students are considered full-time and are charged full tuition for course work of 12 quarter hours or more. In addition, charges are made for course work beyond the normal academic schedule.

Students should note that the freshman year consists of three quarters of full-time study. The Cooperative Plan of Education, whereby students may be gainfully employed, does not begin until the sophomore year.

The primary purpose of cooperative education is to provide invaluable on-the-job training, but co-op also helps make education possible without the accumulation of a large personal debt. Because of the plan—and the University's determination to keep basic expenses as low as possible—many deserving students who might not otherwise be able to afford an education choose Northeastern.

Annual Costs

The chart that follows indicates annual costs for most freshmen and upperclass students. Except for the international students fee, all fees charted are estimates. Costs vary with the year and program of study. Tuition is paid in quarterly installments at the beginning of each quarter. Tuition for freshmen is computed by the year and paid in three equal installments. Those enrolling in September pay at the beginning of the fall, winter, and spring quarters; January enrollees pay at the beginning of the winter, spring, and summer quarters. Upperclassmen pay by the academic quarter.

Room-and-board expenses in University-sponsored residences vary with assigned residence hall. Costs are computed on the basis of a seven-day week and are paid in installments. (See page 44 for detailed per quarter room and board costs.)

| Tuition | | |
|-----------------------------------|------------------------------|--------------------------------|
| College/School | Freshmen* (3 quarters) | Upperclassmen† (2 quarters) |
| Business | \$10,230 (\$3,410) | \$9,680 (\$4,840) |
| Computer Science | | |
| Engineering | | |
| Engineering Technology | | |
| Arts and Sciences | \$9,450 (\$3,150) | \$8,720 (\$4,360) |
| Journalism | | |
| Boston-Bouvé | | |
| Criminal Justice | | |
| Nursing | | |
| Pharmacy and Allied Health | | |
| Alternative Freshman-Year Program | | n/a |
| Boston-Bouvé Physical Therapy | \$9,870 (\$3,290) | \$9,120 (\$4,560) |
| Other Fees and Expenses | | |
| Fees | \$568 | \$545 |
| Books and Supplies | \$480 | \$320 |
| International Student Fee | \$200 once upon entrance | same |
| Additional Personal Expenses | \$540 | \$360 |
| Commuter Transportation | \$750 | \$500 |
| Room and Board | | |
| Room | \$975 to \$1,300 per quarter | same |
| Meal Plan Options‡ | \$820–\$995 per quarter | \$395–\$995 per quarter |

*Freshmen payment deadlines are August 31, 1990; December 17, 1990; and March 25, 1991. Deadlines for January enrollees are December 17, 1990; March 25, 1991; and June 17, 1991.

†Upperclass payment deadlines are by division. Division B students pay September 17, 1990–March 25, 1991; Division A, December 17, 1990–June 17, 1991. Division C students, those who are temporarily or permanently on a non-cooperative plan year, pay beginning September 17, 1990; December 17, 1990; and March 25, 1991.

‡Freshmen will automatically be assigned to the 21 meals per week option (\$995 per quarter) for the first quarter only. For more information, see page 44.

Fees

■ Required Fees for All Students

Application Fee This \$30 fee is required when the application for admission is filed. It is nonrefundable.

Student Activities Fee This \$10 fee is required of all students to fund student clubs, activities, and organizations.

Student Center Fee All students in the Basic Colleges on the Boston campus pay this \$12.50 fee for the services available in the Carl S. Ell Student Center.

Photo-Identification Card All full-time students, staff, and faculty are required to have an officially approved and properly validated photo-identification card. This \$2 card is issued to new students at orientation and registration. Students must show the card at the library, athletic events, student elections, Health Services, and the offices of the bursar or registrar. A replacement card costs \$5.

Residence-Hall Activities Fee All students living within the residence-hall system are charged this quarterly \$5 fee for planned program activities sponsored by the Residence Student Association and the hall governments.

Accident and Sickness Insurance The University provides an excellent hospital insurance and student health program. The nonrefundable University Health Service fee of \$450 covers the group Blue Cross/Blue Shield program and medical services provided by the Health Service. This fee is annual, not quarterly.

■ Other Fees

Deferred Payment Deferred payment of tuition entails a \$10 fee that is levied on all accounts not paid by the end of the second week of classes. To arrange for the deferred payment plan, students must contact the Office of the Bursar before the start of the second week of classes. The following is the only deferred payment plan available:

| Portion of Bill per Quarter | Payment Deadline |
|-----------------------------|----------------------------------|
| First payment 1/3 | First week of quarter |
| Second payment 1/3 | Fourth week of quarter (approx.) |
| Third payment 1/3 | Eighth week of quarter (approx.) |

Late Payment Fee This \$100 fee is assessed for failure to arrange for, and make, payments in accordance with the prescribed regulations.

International Student Fee The one-time fee of \$200 is charged to new undergraduate international students, billed and payable after their acceptance at Northeastern.

Laboratory Deposits Students taking laboratory courses should be prepared to purchase laboratory deposit cards from the Office of the Cashier as directed by the department offering the course. These deposits will be drawn upon to cover any breakage and destruction of apparatus in the laboratory.

Liability Insurance Freshmen in the Colleges of Nursing (bachelor's degree program and special program for RNs) and Pharmacy and Allied Health Professions (respiratory therapy only), as well as all upperclass students in Nursing, Pharmacy and Allied Health Professions (excluding health information administration), and most students in certain programs in the Boston-Bouvé College of Human Development Professions are required to carry an \$18 liability insurance.

Upperclass Housing Deposit The upperclass housing deposit fee is \$75 per quarter.

Warren Center Fees Physical education majors pay a room-and-board charge for a resident program at the Warren Center in the spring quarter of the freshman year. Recreation and leisure studies students pay a fee in the freshman year for a one-week term of camping at the Warren Center.

■ Textbooks and Supplies

The Bookstore is on the ground floor of the Ell Student Center. All books and supplies required for course work at the University may be purchased there.

■ Uniforms

College of Nursing Students in the College of Nursing may expect to be assessed fees for clinical laboratory experiences and for the Nursing Resource Laboratory. In addition, candidates in the College of Nursing who want graduation pins are expected to pay approximately \$200 for each pin. Students in the baccalaureate degree program of the College of Nursing purchase uniforms in the fall quarter of the sophomore year.

College of Pharmacy and Allied Health Professions Dental hygiene and radiotechnologic students purchase uniforms in the fall quarter of the freshman year. Students in the medical laboratory science program buy laboratory coats in the spring quarter. Respiratory therapy students buy their uniforms in the spring quarter of the sophomore year.

Co-op assignment to a hospital usually entails purchase of a uniform in the spring or summer quarter of the sophomore year.

Reserve Officers' Training Corps Uniforms are issued without cost to ROTC cadets. A \$35 deposit is required to ensure the return of the loaned property in good condition. Any loss or damage exceeding the deposit will be charged to the student.

Payment of Tuition

All payments should be made by mail or at the Office of the Cashier, 248 Richards Hall. Checks should be made payable to Northeastern University. Beginning with the second week of any quarter, students are not eligible to attend classes unless their tuition has been paid or specific arrangements have been made with the Bursar for a plan of deferred payment.

It is the student's responsibility to ensure that all tuition and dormitory charges and fees are paid when due. If a bill has not been received prior to the start of classes each quarter, the student must come to the Office of the Bursar where a bill will be processed. If there is a billing problem, the undisputed portion of the bill should be paid on time to avoid any additional late fees. Failure to receive a bill through the mail or to pay the undisputed portion of the bill is not justification for late payment of amounts actually owed.

■ Overloads

Tuition covers the cost of each student's required courses for a quarter. In addition, a course worth one quarter hour of credit may be taken without added charge. However, any other additional courses will be billed as overloads.

Refunds

The University provides all instruction on an academic-quarter basis, for which students pay at the beginning of each quarter. Tuition refunds in all schools and colleges may be granted through the first four weeks of a quarter only when specific conditions are met and on the basis of the date appearing on the official withdrawal application. (Nonattendance does not constitute official withdrawal.) Questions regarding refunds should be discussed with the Office of the Dean of Students. When approved, refunds are made as follows:

■ **Tuition Refund**

| Official Withdrawal Date | Tuition Refund |
|---------------------------------|-----------------------|
| 1st week of quarter | 100 percent |
| 2nd week of quarter | 75 percent |
| 3rd week of quarter | 50 percent |
| 4th week of quarter | 25 percent |

■ **Room and Board Refund**

Rental charges for rooms in University accommodations are refundable only in cases of withdrawal prior to the start of a quarter (except in special circumstances so adjudged by the University). The deposit is not refundable. Board charges may be refunded for all unused portions when the food identification card is surrendered to the University Dining Service.

Financial Aid



Charles M. Devlin, M.Ed., *Dean of Student Financial Services*

The Office of Financial Aid provides a full range of financial services to assist students in paying for their education. In addition to determining eligibility for traditional federal, state, and institutional financial aid programs, the office provides information and services on alternate sources of financial assistance, a reference library, and a part-time job referral service. For assistance or information, contact the office at P.O. Box 75, 356 Richards Hall, Boston, MA 02117; 617-437-3190. Office hours are 8:30 A.M. to 4:30 P.M. from September through June. From July through August, information is available Monday through Thursday, from 8:00 A.M. through 5:30 P.M.

The office library contains resource materials on scholarships, grants, fellowships, prizes, and awards offered by outside agencies and organizations. These reference books, catalogs, and pamphlets are available for review to all Northeastern students during the regular office hours of 8:30 A.M. to 4:30 P.M.

Part-time job opportunities are posted on bulletin boards outside 356 Richards Hall. Most part-time job opportunities are off campus. The part-time employment office also provides assistance in preparing résumés, tips on job interviews, and other information useful in obtaining part-time employment.

Financial aid funds that are awarded on the basis of family income and financial need are administered in accordance with nationally recognized and accepted principles. A fundamental premise of Northeastern's need-based financial aid program is that parents have an obligation to pay for the education of their children to the extent that they are financially able. In addition, students are expected to contribute to their educational cost from summer and co-op earnings, outside agency awards, their own assets, and other resources they may have. Financial aid is awarded only for meeting the difference between total family contribution (from parent and student) and annual educational costs.

Financial aid must be applied for annually, as outlined below. Criteria established by the College Scholarship Service and approved by the U.S. Department of Education are used in making an evaluation of eligibility. This evaluation includes an objective analysis of the family's financial circumstances, including income, household size, number of family members in college, assets, and indebtedness.

■ **Eligibility and Selection**

All financial aid is contingent on the availability of funds. In order to be eligible to participate in the financial aid program at Northeastern University all students must:

- possess U.S. citizenship or be an eligible permanent resident of the United States;
- attend Northeastern University;
- have documented financial need;
- apply for financial aid on the proper application forms and in a timely fashion;
- be enrolled in an eligible degree or certificate program on at least a half-time basis and be making normal academic progress as determined by the college of enrollment;
- meet any other eligibility requirements of the individual aid programs.

Because of limited funding, Northeastern University is not always able to meet the full financial need of all applicants. Priorities in awarding aid will be based on highest financial need, meeting application deadlines, and the potential for academic achievement.

Most students who attend Northeastern University move along with their class. On request, information about retention and attrition can be obtained from the Office of the Dean of Students.

■ **Application Procedure: Undergraduate Programs**

Initial Year (Freshmen and Transfer Students) Applicants seeking financial assistance are required to complete and mail a Financial Aid Form (FAF) to the College Scholarship Service by March 1 for summer or fall entrance and by October 15 for winter or spring entrance. Transfer applicants must also have completed financial aid transcripts from all previously attended post-secondary schools. Financial aid transcripts must be received by April 15 for summer or fall entrance and by October 15 for winter or spring entrance.

On the FAF applicants must indicate Northeastern University (code 3667), the Pell Grant Program, and their state scholarship program (if applicable) as recipients of the FAF. The FAF is available from secondary school guidance offices or the Office of Financial Aid.

Awards are made on a first-applied, first-aided basis and are contingent on continued funding. The typical award takes the form of a package combining a grant, a loan, and/or part-time employment. Awards may be adjusted at any time upon receipt of other funds or changes in status.

Upperclass (Continuing Sophomores–Seniors) Upperclass applicants are required to submit a Financial Aid Form to the College Scholarship Service and a Northeastern University Upperclass Application for Financial Assistance each year for which they desire assistance. On the FAF, applicants must indicate Northeastern University (code 3667), the Pell Grant Program, and their state scholarship program (if applicable) as recipients of the FAF. The FAF must be filed by March 1 for all upperclass aid applicants. The Upperclass Application is due by April 15. Financial aid awards are made for the entire academic year.

Office Hours The Financial Aid offices are located in 356 Richards Hall. Office hours are 8:30 A.M. until 4:30 P.M. from September through June. In July and August, information is available Monday through Thursday from 8:00 A.M. until 5:30 P.M.

The office has a centralized phone system on 617-437-3190. Callers are given number codes that will connect them to the proper extensions for information on Pell Grants, Student Loans, Student Employment, etc. If you are calling from a touch-tone phone, you then punch in the correct code for the extension you need.

State Assistance Programs

The Office of Financial Aid requires applicants for aid to apply to state scholarship programs at the same time that they apply for aid from the University.

State Grants and Scholarships The Commonwealth of Massachusetts provides scholarship aid to Massachusetts students pursuing full-time programs of study in an accredited college or university. Application is made by completing the Massachusetts version of the Financial Aid Form by the published deadline. Awards are made in the summer of each year, and applications for entering freshmen are available through their high school guidance offices. Out-of-state students should investigate aid programs in their respective states. The following states allow students to use their state grants at Northeastern: Connecticut, Delaware, District of Columbia, Maine, Maryland, New Hampshire, Pennsylvania, Rhode Island, and Vermont.

Massachusetts Family Education Loans The Massachusetts Education Loan Authority in cooperation with Northeastern University offers a program of Family Education Loans, under which parents can borrow to pay the cost of education and repay in low monthly installments spread over 15 years. Neither students nor their parents need to be Massachusetts residents in order to qualify. A creditworthy spouse may also borrow under the program.

To participate, a student must be enrolled at least half time. Families may borrow from \$2,000 up to 100 percent of the yearly cost of attendance. Applications may be requested from the Office of Financial Aid.

Federal Programs

All federal financial aid programs are subject to change, depending upon adequate and continuing federal support.

Pell Grant This is a program of direct federal grants to undergraduate students only. Eligible students can receive as much as \$2,300 per year toward the cost of their education. Pell Grants are generally available to all students who have not previously received a bachelor's degree, who are citizens or eligible permanent residents, and who are attending college on at least a half-time basis (minimum six quarter hours). Students must be enrolled in an eligible program for the purpose of obtaining a degree or certificate. To utilize this program to the fullest, all students applying for financial aid must file for a Pell Grant.

Applications for a Pell Grant can be made on the Financial Aid Form (FAF), which is available from local high schools, or by telephoning the Office of Financial Aid.

College Work-Study Program This is a need-based program of part-time employment under the sponsorship of the federal government. It is designed to help full-time students meet their educational expenses. Students generally work part-time while attending classes. Eligible students may work for the University or for public or private nonprofit off-campus agencies.

Supplemental Educational Opportunity Grant Supplemental Educational Opportunity Grants are direct awards provided by the federal government. They are available to a limited number of full-time undergraduate students who present evidence of significant financial need, typically evidenced by Pell Grant eligibility. Eligible students who are accepted for entrance may receive Supplemental Educational Opportunity Grants ranging from \$100 to \$4,000 per year during their undergraduate studies.

Health Professions Loan This program is available to full-time undergraduate students who have been accepted for a course of study leading to a bachelor of science degree in pharmacy. A student who evidences financial need and academic promise may borrow as much as \$2,500 per academic year. Repayment of principal and interest does not begin until one year after the student ceases to pursue a full-time course of study. Repayment of principal may be extended over a ten-year period, with interest at the rate of 5 percent per annum.

Stafford Loan Program Under this program (formerly the Guaranteed Student Loan Program), students who are enrolled for at least one-half the normal academic work load may borrow up to \$2,625 per academic year for the first two years of their degree or certificate program and up to \$4,000 per year for the next three years from a participating bank or other financial institution. The federal government pays the interest while the student is in school. Repayment must begin six months after enrollment drops below half-time.

Applications for the loan are available from local lending institutions, and the Office of Financial Aid can provide additional information. Note that all students must have a Financial Aid Form on file and that upperclass students must also file a Northeastern Upperclass Application for Financial Assistance before submitting their loan applications.

Parent Loans for Undergraduate Students Under the Parent Loan Program (PLUS), parents of dependent undergraduate and parents of dependent graduate students may borrow up to \$4,000 per year for each child enrolled in an approved educational institution. These loans are offered by banks and other financial institutions. Terms and availability vary from state to state.

Unlike the Stafford Loan Program, the PLUS loan requires repayment of the loan to begin within 60 days of receipt. Repayment may be stretched out over ten years if the minimum monthly payment of \$50 is maintained. Applications and more information can be obtained from local lending institutions.

Perkins Student Loan (formerly National Direct Student Loan) Perkins Loans are available to students who present evidence of needing financial assistance. Undergraduate students may borrow up to a maximum of \$4,500 for the first two years, or a total of \$9,000 for their entire undergraduate education. Students are allowed a total maximum of \$18,000 through their undergraduate and graduate educations.

Repayment of principal and interest on Perkins Loans is not required until six or nine months after a student graduates, withdraws, or drops below half-time enrollment. Repayment of principal may be extended over a ten-year period, with the interest rate at 5 percent per annum. Repayment may be deferred up to three years if the student is pursuing at least a half-time course of study or serving in the Peace Corps, VISTA, or the armed forces.

Nursing Student Loan This program is designed for full-time undergraduate students who have been accepted for a course of study leading to a bachelor of science degree in nursing. Provided financial need is evident, students may borrow as much as \$2,500 each year up to a maximum amount of \$13,000 for their entire undergraduate education.

Repayment and interest on these loans do not begin until nine months after the student ceases to pursue a full-time course of study. The repayment of the principal may be extended over a ten-year period, with the interest at the rate of 5 percent per annum.

Supplemental Loans for Students Under the supplemental loans program, independent undergraduate and all graduate students, whether dependent or independent, may borrow up to \$4,000 per year. These loans are offered by various banks and other financial institutions. They are unlike Stafford Loans in that the federal government does not pay the interest while the student is in school; that interest is added to the principal balance.

The student must begin repayment after dropping below half-time enrollment. Applications and more information are available from participating local lending institutions. Students must apply for Stafford Loans before applying for the SLS program.

Reserve Officers' Training Corps Scholarship Program See the Scholarship sections on the Reserve Officers' Training Corps, pages 193–197.

University Scholarships

The University awards numerous scholarships through the Office of Financial Aid. Because each scholarship is awarded specifically to students who qualify, students should not apply for any specific scholarship. However, students who feel they may be a potential recipient for certain awards may bring that fact to the attention of the Office of Financial Aid by noting their interest in particular scholarships on the Upperclass Application. For a complete list of University scholarships, see pages 240–259 of the Appendix.

Other Scholarships

Several scholarships awarded to Northeastern students are funded by outside sources. Recommendation for the specific award is made by one of the several college scholarship committees or the departments concerned, in conjunction with the Office of Financial Aid. Students who feel they may be a potential recipient for any of these awards should notify their financial aid counselor in writing. For a complete list of scholarships funded by outside sources, see pages 259–261.

Housing

Department of Residential Life



Adjusting to college life is challenging on several levels. Mindful of this, the Department of Residential Life strives to provide students with a supportive environment and a strong sense of community.

■ Residence Halls

The University provides a variety of residence halls: freshman, coed, and single-sex halls; upperclass men's and women's apartments; three academic theme halls (Honors, Engineering, and Computer Science Program); an international hall; and designated quiet locations. Each residence hall is under the direction of a full-time professional residence director, assisted by a team of undergraduate resident assistants who provide educational and social programs and support residents in their academic and personal development. Students living in a residence hall are members of their respective residence hall council, which represents student opinions and assists in the organization of programs and activities.

Most residence halls have lounge and study areas, as well as laundry and recreation rooms. Student rooms are equipped for comfortable residence hall living. The University supplies a bed, dresser, desk, and chair for each student. Students provide their own draperies, bedspreads, bed linen, pillows, towels, lamps, rugs, bookcases, and wastebaskets. The Department of Residential Life is located in 104 Ell Building. For more information, telephone the appropriate number below.

Telephone Numbers and Hours

| | |
|---------------------------|---|
| Assignments and Billing | 104 Ell Building 617-437-2814 FAX 617-437-8794 8:30 A.M.-4:30 P.M. |
| Student Life | 4 Speare Hall 617-437-2004 8:30 A.M.-4:30 P.M. |
| Facilities and Operations | 17 Cushing Hall 617-437-5872 8:30 A.M.-4:30 P.M. |

Note: The hours above are for September through June. From July through August, information is available Monday through Thursday, from 8:00 A.M. through 5:30 P.M.

■ **Housing Options**

The choice of housing is an important consideration for the freshman year, and students are encouraged to visit Northeastern before making a decision. In general, the University recommends that students not living at home reside in University housing, but the decision is up to the student. Arrangements for off-campus housing are the responsibility of students and their families. Students who live within commuting distance of the campus should be sure about their housing plans for the year before signing the residence license agreement.

Most rooms accommodate two students; however, three- and four-person rooms are available. Some residence halls offer suites for two to seven students. All suites have one to three bedrooms and a bathroom; some have a common area.

The University maintains some apartment units for upperclass men and women. These apartments accommodate up to four students. Assignments are made on the basis of the date of receipt of the housing deposit and application. Each unit is fully furnished, and the rental charge includes utilities.

■ **Housing Applications and License Agreement**

Housing applications and residence license agreements are administered by the Department of Residential Life. Housing is subject to available space. Students who have been accepted by the University and have requested housing on their applications for admission will receive a housing application and deposit card after payment of the \$100 tuition deposit.

To complete the housing application process, freshmen and transfer students must return the housing application to the Department of Residential Life and the deposit card with a \$400 room deposit to the Cashier's Office. The nonrefundable and nontransferable housing deposits are credited toward the last quarter of the first year residence charges.

The residence license agreement for freshmen is for three full quarters of the year. The license agreement for freshmen with partial credit is also for three full quarters. The license agreement for transfer students is for one quarter at a time. All students are assigned on a first-come, first-served basis.

■ Costs for Room per Quarter*

All single rooms are charged at an additional rate of \$150 per quarter. Returning upperclass students must apply for housing each quarter. The upperclass housing deposit is \$75 per quarter. See page 32 for other residence-related fees.

Traditional Residence Halls

| | |
|-------------------|---------|
| Kerr Hall | \$1,105 |
| Light Hall | \$1,105 |
| Melvin Hall | \$1,105 |
| Smith Hall | \$1,105 |
| Speare Hall | \$1,105 |
| Stetson Hall East | \$1,105 |
| Stetson Hall West | \$1,105 |
| White Hall | \$1,105 |

Suites

| | |
|----------------------------|---------|
| Kennedy Hall, 153 Hemenway | \$1,105 |
|----------------------------|---------|

Apartments

| | |
|--|---------|
| Burstein Hall, 458 Huntington Avenue | \$1,210 |
| Fairwood, 319 Huntington Avenue; | \$1,105 |
| 337 Huntington Avenue | \$1,210 |
| 407 Huntington Avenue | \$1,210 |
| Rubenstein Hall, 464 Huntington Avenue | \$1,210 |
| 106-122 St. Stephen Street | \$1,210 |
| Willis Hall, 50 Leon Street | \$1,300 |

*The above quarterly rates are for the 1990-91 academic year only. Costs and types of residence halls (coed, male, female) are subject to revision by the President and Board of Trustees at any time. The resident composition of any building may be adjusted at any time based on changes in the demographics of the student population.

■ University Dining Service

All students who live in traditional University residence halls and suites are required to participate in the food plan run by the University Dining Service. Three different meal plans are available. During the first quarter, all entering freshmen must participate in the 21-meal option. They have the option to select another plan at the start of the second quarter of the academic year.

| Meals per Week | Cost per Quarter* |
|-----------------------|--------------------------|
| 21 | \$995 |
| 15 | \$900 |
| 10 | \$810 |
| 5 | \$395 upperclass only |

*The above quarterly rates are for the 1990-91 academic year only. Dining plan costs are subject to change at any time.

Dining Plus This plan is an expansion of the 10-, 15-, 21-meal plan that allows board plan participants to deposit money into an account and then to use their meal card to purchase meals or snacks at any of the retail dining facilities on campus.

Note Students in University apartments are not required to be on the food plan, but they may choose one of the meal plans if they wish. When conditions warrant, the University may close or consolidate certain dining facilities.

■ Orientation

The Student Orientation Staff is a group of upperclass students who provide incoming freshmen with a comprehensive orientation to the university. Members of this group greet new resident students and help them move into halls. Orientation includes educational and social programs that give new residential and commuting students the opportunity to learn more about the university and to relax and have fun as they begin their studies at Northeastern.

■ Residence Hall Staff

The residence community is divided into three campus areas, each of which is directed by an area coordinator who represents the residential life administration in all student personnel and housing matters. Each residence hall within an area is staffed by a residence director, graduate assistant, or resident assistant who maintains close contact with the students in the hall and serves as its administrator.

■ Residence Hall Proctors

Residence hall proctors are stationed at the entrance of most residence halls. Proctors make reasonable efforts to ensure that only residents and their guests are admitted to the building.

■ Residence Hall Security

While the Department of Residential Life tries to provide pleasant and safe residence halls, it reminds students that each individual who lives, works, or studies in an urban environment has a responsibility to observe courtesy to neighbors, basic personal safety, and security practices. The Department of Residential Life does indeed realize the extra demands for personal safety imposed by urban life. It maintains constant vigilance: residence halls are locked 24 hours a day, entrances are monitored, and proctors ensure that only residents and their guests gain admission. The proper authorities are notified when unauthorized persons attempt to gain access. The University urges students to recognize the seriousness of abiding by security policies and practices. (See also the Public Safety Division section, page 224.)

■ Residence Hall Closings

Residence halls are officially closed during extended University intersession periods between quarters. During these periods, students are expected to vacate their rooms.

■ Residence Hall Policies

For policies, rules, and regulations regarding residence hall living, please refer to the *Student Handbook* and *A Guide to Residence Hall Living*.

■ Fraternity Housing

Certain fraternities provide opportunities for room and board for men at reasonable rates. Information regarding these housing facilities may be obtained from the Off-Campus Housing Referral Service, 104 Ell Building.

■ Married Student Housing

At this time, the University does not provide married student housing.

■ **Sports Facilities**

The university has two outdoor facilities—basketball courts and volleyball courts—where resident students may participate in sports activities.

■ **Escort Service**

The Division of Public Safety provides an escort service, which is available to all members of the University. The service operates 24 hours a day, every day of the year, and provides escorts to any location on campus.

■ **Cars on Campus**

Freshmen living in residence halls are not allowed to have cars or other powered vehicles on campus.

Upperclass students are strongly discouraged from bringing cars with them, as the University does not permit overnight parking and there is a severe shortage of public parking spaces near the University. Cars parked in violation of this policy will be towed at the owner's expense. Only students on full-time cooperative education experience who require a car for work may apply for an overnight parking sticker. For further information, contact the Office of Traffic Services, 124 Forsyth Building.

■ **Bicycles**

Bicycle racks are provided at various locations on campus for use by students. Bicycles may not be chained to fences, doors, trees, or other objects. Under no circumstances may bicycles be brought into any school building.

■ **Guided Tours**

Arrangements for tours of the Northeastern campus, including residence halls, may be made by telephoning the Department of Undergraduate Admissions at 617-437-2211.

Academic Policies

Academic Policies at Northeastern

■ The Academic Year

Northeastern University operates on a quarter-system calendar.

■ Quarter-Hour Credits

All courses are evaluated in terms of quarter-hour credit. A quarter-hour credit is equal to three-fourths of a semester-hour credit. Classes at Northeastern are scheduled in different modules.

In assessing quarter-hour weights for courses, the following statement applies: *One quarter hour of credit is three hours of student learning time per week, usually one hour of lecture or discussion plus two hours of individual study time, over a quarter.*

■ Grades

A student's grade is officially recorded by letter. Introduced in September 1980, the following grades, listed below with their numerical equivalents, remain in effect:

| | | | |
|-----------|-------|-----------|-------|
| A | 4.000 | C | 2.000 |
| A— | 3.667 | C— | 1.667 |
| B+ | 3.333 | D+ | 1.333 |
| B | 3.000 | D | 1.000 |
| B— | 2.667 | D— | 0.667 |
| C+ | 2.333 | F | 0 |

■ Grades and Examinations

Examinations covering the work of the quarter usually are held at the close of each quarter. Exceptions may be made in certain courses where, in the opinion of the instructor and with the approval of the dean of the college concerned, final examinations are not necessary.

Freshmen who are taking a full academic program and who have a weighted average for the year below 1.4 will not be permitted to register for advanced work. Upperclass students should consult the *Student Handbook* to ascertain the level of continuing achievement required of them by the faculty of their college.

An incomplete (I) grade indicates that the student has not completed the course requirements.

An official University grade report is mailed to each student at the end of each quarter.

■ Pass/Fail System

Students may register for a limited number of courses on a pass/fail basis. Each college has its own rules governing this system. Common to all colleges, however, is the grading system. Pass/fail grades are not included in the calculation of the quality-point average. Only pass grades earn credits toward degree requirements. (Pass/fail guidelines are also stated in the *Student Handbook*.)

■ Dean's List

At the end of each quarter a Dean's List is issued containing the names of students who have a 3.250 quality-point average or higher, with no I (incomplete) grade or grade below C—. A student who is on any form of probation, enrolled in a course on a pass/fail basis (except where there is no alternative or where required by the pro-

gram), or not carrying a full load as determined by his or her Basic College will not be eligible. With few exceptions, as approved by the respective colleges, a full load is normally considered to be four courses or 16 quarter-hours.

■ Graduation with Honors

At graduation, Northeastern bestows honors on those students exemplifying outstanding academic achievement. Those students graduating with honors must have completed a minimum of six full-time quarters. Upon special vote of the faculty, honors are conferred based on the following criteria:

| Quality-Point Average | Honor Conferred |
|-----------------------|--------------------------------|
| 3.25–3.49 | Honors—Cum laude |
| 3.50–3.74 | High honors—Magna cum laude |
| 3.75–4.00 | Highest honors—Summa cum laude |

■ Changes of Program

The University reserves the right to withdraw, modify, augment, or change the order or content of courses in any curriculum. It further reserves the right to change tuition, fees charged, and other regulations.

Any changes that may be made from time to time pursuant to the above policy shall be applicable to all students in the school, college, or department concerned, including former students who may re-enroll.

■ Reports on Scholastic Standing

Reports are issued after each grading period. Questions about grades are to be discussed with the student's faculty adviser. Parents and students may confer with college officers and faculty advisers on this and other relevant academic matters.

■ Transcripts

Applications for transcripts of record are made at the Office of the Registrar, 117 Hayden Hall. A fee of \$2 is charged for each transcript request.

■ Middler-Year Writing Requirement

All students must successfully complete the Middler-Year Writing Requirement.

- The Middler-Year Writing Requirement must be fulfilled for graduation with a bachelor's degree. A prerequisite for the Middler-Year Writing Requirement is the successful completion of Freshman English (or equivalent).
- The Middler-Year Writing Requirement may be fulfilled after the student has successfully completed at least 80 quarter hours of academic work (including transfer credit) and before completing 144 quarter hours. The requirement must be fulfilled at Northeastern.
- As determined by each college, the Middler-Year Writing Requirement may be fulfilled by passing one designated, upper-division four quarter-hour writing course with a grade of C (2.0) or better or by passing a one quarter-hour writing course (Writing Workshop) pass/fail for designated majors, or by petition for all others. Upperclass students should consult their college adviser or Middler-Year Writing Requirement Office in the Department of English to see which option applies to them.

The *Undergraduate School Course Description and Curriculum Guide* and the *Student Handbook* specify the details of the writing requirement for both entering freshmen and transfer students.

■ **Attendance**

Students are expected to attend all meetings of their classes. Absence from regularly scheduled classes may seriously affect the standing of the student and result in the University's dropping the subject or subjects from his or her schedule. Laboratory work can be made up only during hours of regularly scheduled instruction.

■ **General Conduct**

It is assumed that students come to the University for a serious purpose. The University community expects each student to respect the rights and privileges of others and to adhere to acceptable standards of personal conduct. Students should exercise their freedom with maturity and responsibility. They are expected to obey University regulations and to follow the instructions of and pay due respect to University officials. Conduct inconsistent with the general order of the University may result in disciplinary action. Damage to any building or to any of the furniture, apparatus, or other property of the University will be charged to students involved.

Any form of academic dishonesty is regarded as a most serious offense and renders the offender liable to disciplinary action. Aiding and abetting a student in any dishonesty is also held to be a grave breach of discipline.

The University administers discipline with a high standard of integrity and a scrupulous regard for truth.

Academic Programs

College of Arts and Sciences



Robert P. Lowndes, Ph.D., *Dean*

Ronald J. McAllister, Ph.D., *Associate Dean, Academic Affairs*

Kay D. Onan, Ph.D., *Associate Dean, Faculty Affairs*

Mary Mello, M.A., *Director, Academic Administrative Services*

Charles J. Haberle, M.S., *Coordinator, Undergraduate Student Services*

Gail F. Leclerc, M.Ed., *Counselor to Undergraduates*

Marva Perry, M.Ed., *Assistant Dean, Minority Affairs*

Clare Thalken, M.Ed., *Coordinator, Undergraduate Student Services*

Joseph O. Monahan, M.A., *Coordinator, International Study Programs*

A broad study of disciplines in the arts and sciences is the core of higher education. Most students in the University — no matter what career training they choose — devote a substantial portion of their studies to the arts and sciences.

The College of Arts and Sciences is comprised of programs grouped informally into the following areas: performing and visual arts, humanities, sciences and mathematics, and social sciences. The college as a whole emphasizes general education through

the college core curriculum. In addition, a large number of interdisciplinary and extradisciplinary programs are available. These include national and international exchange programs for employment and/or study; programs in field settings at sea and abroad; and cultural programs involving affiliations with professional performing arts organizations. These programs are described at the end of the Arts and Sciences section of this bulletin (see pages 86–94).

Graduates find they are prepared for a variety of employment opportunities. Many accept employment after receipt of the bachelor's degree. Others go on to graduate-level studies. Some pursue advanced study in areas related to their undergraduate field.

Four- and Five-Year Programs In all programs, students may choose a four-year, full-time track or the five-year Cooperative Plan of Education. The Five-Year Plan offers opportunities for paid employment, often in an area related to the student's chosen academic area. Students are normally eligible to participate in the Cooperative Plan of Education when they become sophomores.

■ Major Programs

Freshmen may declare a major prior to their matriculation. Students who enter as freshmen with no specified major (liberal arts major preference, referred to as LAMP) must declare a major by the end of the freshman year. Considerable flexibility exists, however, and many students change majors during the first two years.

The college offers a bachelor of arts degree and a bachelor of science degree in most programs. Students majoring in human services, however, may earn a bachelor of arts degree only. Those majoring in art and architecture with a concentration in architecture or in visual and media design, in applied physics, or in political science with a concentration in public administration may earn only a bachelor of science degree.

In general, the bachelor of arts degree requires more college core curriculum courses as well as a foreign language. The bachelor of science degree requires fewer core curriculum courses but more work in the specific major.

■ Double Majors

Many programs are flexible enough to allow students to pursue a double major. To do so, students must complete requirements for both majors.

■ Honors Program

The College of Arts and Sciences participates in the University Honors Program. For more information, see pages 18–19.

■ Graduation Requirements

Quantitative All degree candidates must successfully complete a minimum of 176 quarter hours of credit, of which at least 144 quarter hours must be in Arts and Sciences courses taken either in Northeastern University's day school or at other institutions. Only four quarter hours of physical education credits and no ROTC credits may be used to meet degree requirements.

Residency Candidates must complete either 75 percent of their degree credits or the last three full quarters (minimum, 12 full courses) in Northeastern's day school.

Qualitative A minimum cumulative average of 2.0 (grade of C) is required for graduation.

Transfer Credit Transfer credit is granted initially only for Arts and Sciences courses comparable to courses given in Northeastern University's Basic Day Colleges. In the first quarter in residence, students may petition for additional transfer credit in such areas as business, engineering, and nursing. Up to 32 credits of non-Arts and Sciences courses may be granted. No transfer credit will be granted for courses in which the student received lower than a C (2.0) grade or for courses in which a pass/fail grade was received. For courses in progress at the time of a transfer student's application, an updated transcript showing grades must be submitted in order for transfer credit to be granted. For more information, see Admission of Transfer Students, page 22.

Freshman English All degree candidates must complete two quarters of Freshman English (normally Freshman English I and II) at Northeastern. Students who need extra assistance in writing skills may have to take three quarters of Freshman English.

Middler-Year Writing Requirement All students must fulfill an upper-division writing requirement. This is normally done after successful completion of 80 quarter hours (middler year for co-op students or junior year for non-co-op students). Students should check with the Middler Year Writing Office or the Office of the Dean of Arts and Sciences for details on options available for meeting this requirement.

Mathematics Requirement All freshmen will take a mathematics placement test prior to the start of classes. Students must complete basic course work and prove proficiency in college-level mathematics. This is normally done during the freshman year. Refer to the College of Arts and Sciences *Student Guidebook* for details.

Major Degree candidates must successfully complete the courses specified as major requirements. A complete listing of these required courses is published in the *Basic Day Colleges Course Descriptions and Curriculum Guide*.

College Core Curriculum All students must complete the college core curriculum by taking courses in the following: basic skills, both communicative and quantitative; methods of inquiry; Western cultural heritage; alternative cultures and societies; theoretical perspectives and changes; and current issues in perspective. Details on the core curriculum are provided to students upon entry and are also published in the Arts and Sciences *Student Guidebook* available in the College of Arts and Sciences Dean's Office.

Foreign Language All bachelor of arts degree candidates must show proficiency in a modern foreign language by earning a passing grade in intermediate-level II of a college course or by meeting a comparable criterion approved by the Department of Modern Languages.

Conditional exemption from this requirement may be granted to students who earned an average of C or better in a full, four-year language sequence in secondary school or to students who earned an average grade of A in a three-year language sequence in secondary school. A conditional exemption must be confirmed by taking a proficiency examination during the first quarter at the University. A sufficiently high score will verify the exemption; otherwise, the student will be advised of the appropriate language course to take in the following quarter.

An *absolute exemption* will be granted to students for whom English is a foreign language or who receive a score of 550 or better in the Language Achievement Examinations.

The normal sequence for students with no prior preparation is two quarters of elementary-level language and two quarters of intermediate-level language. The Department of Modern Languages will determine an appropriate entry point at which students who have partial language preparation may begin completing the requirement. Students who plan to use Russian or Italian to fulfill the foreign language requirement should begin study as early as possible. The college is not able to offer these courses on a regular basis.

- **Graduation with Honors** See page 49.

- **Advising and Placement**

Upon acceptance to the college, students are assigned to a faculty adviser in their major department or, for students who are unsure about a major, to a specially assigned liberal arts major preference (LAMP) adviser. LAMP advisers work to help freshmen determine areas of interest and choose a major by the end of the freshman year. With this adviser, students choose courses that suit their interests and abilities and the requirements of their major.

When necessary, students may undertake studies in skill development to improve their chances of success in college. Continual monitoring and mentoring by faculty advisers is provided throughout the undergraduate years.

The Arts and Sciences Dean's Office is the central administrative office for students majoring in arts and sciences programs. Dean's Office counselors work closely with faculty advisers to help students plan study programs and to handle administrative problems. The Dean's Office at 400 Meserve Hall is open from 8:30 A.M. to 4:30 P.M., Monday through Friday, during the fall, winter, and spring quarters, and from 8:00 A.M. to 5:30 P.M., Monday through Thursday, during the summer.

- **Student Services**

The Math Center Instructional assistants offer free one-on-one help in clarifying concepts, explaining methods, and checking homework. Center hours are Monday through Friday, 9:00 A.M. to 4:00 P.M. Students in algebra review courses and introductory math courses may make appointments at 102 Cahners Hall. Advanced-course students may drop in on Tuesdays and Thursdays.

The Writing Center Trained tutors offer free assistance with assignments or other writing tasks. Center hours are Monday through Thursday, 10:00 A.M. to 4:00 P.M. and some evening hours. Students may drop in at 102 Cahners Hall or phone 617-437-3086 for an appointment. Students should bring their writings with them.

- **Graduate Education** For information on graduate degrees, see page 205.

- **Program Descriptions and Regulations**

The following pages briefly describe each major in the College of Arts and Sciences. Within each area of the college, the majors are listed in alphabetical order. Summaries of the areas can be found on the following pages: Performing and Visual Arts, page 56; Humanities, page 59; Sciences and Mathematics, page 65; Social Sciences, page 73.

A summary of the special programs in the college can be found on page 86. A complete listing of individual courses, including a short description of contents for each course, is given in the *Basic Day Colleges Course Descriptions and Curriculum Guide*, available from the Office of the Registrar.

Performing and Visual Arts

The arts are fields that combine knowledge and skill. A distinction is often drawn between performing arts—music, dramatic art, and dance—and fine arts—painting, drawing, sculpture, and architecture. The performing and visual arts at Northeastern are comprised of the departments of art and architecture, music, and theatre and dance.

All branches of the arts are being affected by changes in technology. Today the arts include not only fine arts and performing arts, but also computer graphics, environmental design, and other forms of visual communication.

The performing and visual arts area (pages 92–93) incorporates arts programs and services, a community arts department, and several artists-in-residence groups.

Department of Art and Architecture

Peter Serenyi, Ph.D., *Professor and Chairman*

| <i>Professor</i> | <i>Assistant Professors</i> | <i>Lecturers</i> |
|-----------------------------|-----------------------------|-------------------------------|
| Mardges Bacon, Ph.D. | Mira Cantor, M.F.A. | Judith Brassard Brown, M.F.A. |
| <i>Associate Professors</i> | Mary Ann Frye, M.F.A. | Harel Kedem, M.A.A.S. |
| Samuel S. Bishop, M.F.A. | Renee LeWinter, M.A. | Erik F. Kirton, M.Arch. |
| T. Neal Rantoul, M.F.A. | Dianne W. Pitman, Ph.D. | Pamela A. Patton, M.A. |
| | | Thomas J. Petit, M.F.A. |
| | | Wenzel Pitelka, M.F.A. |

Degrees Offered: Bachelor of Arts, Bachelor of Science,
Bachelor of Science with a concentration in visual and media design

The visual arts are our oldest form of artistic expression. The use and understanding of visual language increasingly is a necessary part of contemporary education.

The aims of the department are to:

- introduce art and architecture both as history and as creative activity;
- offer a focused study of the visual arts through critical examination of both the language and content of art and architecture in the context of a particular historical period, or through the hands-on experience of a studio setting;
- offer a solid academic foundation for a career in art and architecture or related fields.

A main resource of the department is Boston itself. The city's architecture spans 300 years, its museums are world famous, its galleries and cinemas offer the latest in their respective areas, and its public library is one of the best of its kind. Teaching students to use these resources systematically is an all-embracing aim of the department.

■ Professional Preparation

The department offers preprofessional preparation for students interested in pursuing a career in architecture, graphic design, photography, and the teaching of the history and practice of art. Cooperative education work assignments for majors include positions in museums, libraries, historical collections, archives, architectural firms, design firms, and the Northeastern University Art Gallery.

■ **The Major**

The department offers a general major in art and two concentrations within the major: architecture and visual and media design.

Departmental requirements for the major in art are a two-part survey course in art history, a two-part visual foundations course, a drawing course, and 12 electives in art and/or architecture plus the core curriculum. With prior approval, courses may be taken in one of the neighboring art schools or universities.

Architecture This concentration leads to a bachelor of science degree, not a professional degree in architecture. The requirements are similar to the art major, except that the 12 art electives are replaced by four architectural history courses, six architectural design courses, two art or architecture studio electives, four technical courses, two computer-aided design courses, and five math/science courses. Students must begin to take the required courses in the freshman year.

Visual and Media Design In this concentration the 12 art electives required for the general art major are replaced by 16 studio courses, two history of art courses, one speech communication course, and two business courses. To fulfill all requirements, students must begin to take required courses in the freshman year.

■ **The Minor**

The minor program consists of a general minor and the following concentrations: history of art and architecture, graphic design, photography, and studio art. Students interested in the minor program should consult the department chair.

■ **Related Programs**

See Center for Asian Studies (page 211); see also Cinema Studies Minor, International Programs, Media Studies Minor, Performing and Visual Arts, and Teacher Preparation Option in the Special Programs section, which begins on page 86.

Department of Music

Joshua R. Jacobson, D.M.A., *Professor and Chairman*

| | | |
|-----------------------------|----------------------------|-------------------------|
| <i>Professors</i> | <i>Assistant Professor</i> | John Tyson, B.M. |
| Reginald Haché, Art. Dip. | Leonard Brown, Ph.D. | Shiela Waxman, D.M.A. |
| Roland L. Nadeau, M.M. | <i>Lecturers</i> | <i>Visiting Faculty</i> |
| <i>Associate Professors</i> | Marjorie Atlas, M.M. | Allen Feinstein, M.M. |
| Julia A. Griffin, Ph.D. | Steven Cornelius, Ph.D. | Phillip Terrell, M.M. |
| William Lowe, M.A. | Douglas Durant, Ph.D. | |
| Dennis H. Miller, D.M.A. | Charles Mokotoff, M.M. | |
| David Sonnenschein, D.M.A. | Karen L. Pokross, Ed.M. | |
| Judith Tick, Ph.D. | Jeanne Segal, M.M. | |

Degrees Offered: Bachelor of Arts, Bachelor of Science;
Bachelor of Arts or Bachelor of Science with a concentration in Music Industry

The primary aim of the department is to foster an appreciation of music by enabling students to understand and intelligently evaluate musical compositions.

Courses are offered in general appreciation, music theory, the history of music (both Western and non-Western), applied music lessons, and the music industry. Performing ensembles provide the opportunity for first-hand experience with music studied in the classroom. An extensive concert series offers a variety of performances by faculty, students, and guest artists. Hands-on musical training is reinforced by a piano laboratory, an electronic music laboratory, and a listening center.

■ **Professional Preparation**

A major in music enables students to prepare for a wide range of professions, including performance, teaching, church music, arts administration, composition, music therapy, broadcasting, and studio production.

■ **The Major**

The degree program offers a broadly based curriculum that allows students to concentrate in music while acquiring a comprehensive education in the humanities and sciences.

Music Literature This concentration focuses on the analysis of music from theoretical and historical perspectives. Students must complete seven courses in music theory, ear-training, and analysis; five courses in music history; one course in keyboard proficiency; two courses in art and theatre; and eight ensemble credits. Remaining course work is selected from a broad base of electives and the college core curriculum.

Music Industry This concentration combines analysis of music with courses on various aspects of the music business. Students must complete four courses in music theory, ear-training, and analysis; two courses in music history; one course in keyboard proficiency; seven courses in the music industry; eight courses in business; one course in related arts; and four ensemble credits. Remaining course work is selected from a broad base of electives and the college core curriculum.

Music Literature and Performance This concentration combines scholarly work with advanced instrumental instruction. Students must complete six courses in music theory, ear-training, and analysis; four courses in music history; one course in keyboard proficiency; six courses in private instruction; two courses in art and theatre; and eight ensemble credits. Remaining course work is selected from a broad base of electives and the college core curriculum.

■ **The Minor**

The minor consists of three courses in music theory, two courses in music history, one course in keyboard proficiency, and one elective in music.

■ **Related Programs**

See Boston Lyric Opera, International Programs, League of Composers, New England Composers Orchestra, New England Conservatory Affiliation, Performing and Visual Arts, and Teacher Preparation Option, in the Special Programs section, which begins on page 86, and *Essays on Modern Music* in the section on journals, which begins on page 93.

Department of Theatre and Dance

| | | |
|---|-----------------------------|----------------------------|
| Del E. Lewis, M.F.A., <i>Associate Professor and Chairman</i> | | |
| <i>Professor</i> | <i>Associate Professors</i> | <i>Assistant Professor</i> |
| Mort S. Kaplan, M.A. | Janet L. Bobcean, M.F.A. | Nancy Kindelan, Ph.D. |
| | Jerrold A. Phillips, Ph.D. | |
| <i>Degrees Offered:</i> Bachelor of Arts, Bachelor of Science | | |

Theatre is a moving force in our society because it involves both the performer and the spectator in a manner unlike other creative and communicative arts.

■ Professional Preparation

The Department of Theatre and Dance offers a program that provides a balance between theory/history/literature courses and studio rehearsal and performance work. The program provides the background for advanced study on a graduate level or for a career in the professional theatre.

■ The Major

The program is designed to help students understand the essentials necessary as a foundation on which to elect one of the following concentrations: acting/directing or technical/design.

The classroom and stages are the laboratories where theory is tested. Theatre majors are encouraged to express creative and interpretative impulses and, with the support of a faculty adviser, are often able to perform a variety of projects of their own initiation in acting, directing, playwriting, design, or performance art.

In addition to completing the courses required by the college, majors in all concentrations must complete 48 quarter hours of the departmental core, which includes such courses as Introduction to Acting, Concepts of Directing, Stagecraft, Introduction to Theatre Design, and Introduction to Theatre Arts.

All theatre majors are expected to work in production each quarter they are in residence and to fulfill a variety of crew assignments in construction, painting, sound, lighting, costuming, and box-office work, as well as crew assignments for the running of a show. Whenever possible, majors are expected to serve as stage managers and assistant stage managers. Appearing in a production is not a substitute for crew work.

Theatre majors must maintain a regimen of physical conditioning while in residence. The following courses, when available, are recommended: Modern Dance, Ballet, Jazz Dance, Tumbling, Gymnastics, Fencing, and Physical Conditioning.

■ The Minor

The minor requires eight courses (32 quarter hours). Supervised by a departmental faculty adviser, students may follow a generalized or a specialized program.

■ Related Programs

See American Sign Language Programs, Cinema Studies Minor, International Programs, Irish Studies Program, Performing and Visual Arts, and Teacher Preparation Option in the Special Programs section, which begins on page 86.

Humanities

The humanities address and exemplify basic questions that confront every generation: the nature of truth, knowledge, and beauty. The ideas, texts, and traditions that have shaped us are their unifying materials. At Northeastern the humanities are comprised of English, journalism, modern languages, philosophy and religion, and speech communication.

Humanities departments are related not only by their exploration of common areas of knowledge but, more importantly, by their reliance on such analytical processes as careful reading and critical thinking. Thus, civilization is understood and the humanities are preserved.

Department of English

| | | |
|---|------------------------------|-------------------------------|
| M. X. Lesser, Ph.D., <i>Professor and Acting Chairman</i> | | |
| <i>Professors</i> | Gerald R. Griffin, Ph.D. | <i>Lecturers</i> |
| Samuel J. Bernstein, Ph.D. | Stuart S. Peterfreund, Ph.D. | Joseph deRoche, M.F.A. |
| Robert J. Blanch, Ph.D. | Janet Randall, Ph.D. | David Tutein, M.A. |
| Francis C. Blessington, Ph.D. | Kristin Woolever, Ph.D. | <i>Continuing Lecturers</i> |
| Irene Fairley, Ph.D. | <i>Assistant Professors</i> | Ken Capobianco, M.A. |
| Gary Goshgarian, Ph.D. | Kathy Howlett, Ph.D. | Randy Garber, M.A. |
| Earl N. Harbert, Ph.D. | Nicholas Humy, Ph.D. | Claire E. Knox, M.A. |
| James E. Nagel, Ph.D. | Kathleen Kelly, Ph.D. | Eileen Mills, M.A. |
| Kinley E. Roby, Ph.D. | Marina Leslie, Ph.D. | Virginia C. Parsons, M.A. |
| Guy Rotella, Ph.D. | Mary K. Loeffelholz, Ph.D. | Bradley Smith, M.A. |
| Michael Ryan, Ph.D. | Linda Loehr, Ph.D. | Stephen Sutherland, M.A. |
| Herbert L. Sussman, Ph.D. | Joyce H. Scott, Ed.D. | Marion Van Nostrand, M.A. |
| Arthur J. Weitzman, Ph.D. | Henrietta N. Shirk, Ph.D. | <i>Administrators</i> |
| Joseph E. Westlund, Ph.D. | Charles H. Sides, Ph.D. | Janet M. Carr, M.A.W. |
| <i>Associate Professors</i> | Susan Wall, Ph.D. | Kalo Clarke, M.A. |
| Timothy R. Donovan, Ph.D. | <i>Instructor</i> | Jean S. Mullen-Smith, M.A. |
| Maryemma Graham, Ph.D. | E. Kim Stone, Ed.M. | Lolly Ockerstrom Snyder, M.A. |
| <i>Degrees Offered:</i> Bachelor of Arts, Bachelor of Science | | |

The Department of English curriculum offers courses in creative, expository, and technical writing; linguistics; literary studies; and American and British literature.

Mastery of the written word is an essential survival tool. The study of language and literature provides insight into the world’s complexity and helps give shape and meaning to life experiences. Language is the symbolic structure that contains us, defines us, and from which we create ourselves. To study language in its various forms is to study what it is to be human.

■ Professional Preparation

The curriculum enables students who major in English to prepare for careers in teaching and research, advertising and publishing, radio and television—indeed, any field in which communication and judgment go hand in hand. The department also offers a broad intellectual and cultural framework for preprofessional students—in law, medicine, business, engineering, or computer science.

■ The Major

After completing the freshman requirement, the English major takes survey courses, area courses (in language or writing, British literature, American literature, major figures, genres), other electives, and a senior seminar. Students may study science fiction, African-American literature, topics in film, or children’s literature as well as Shakespeare, early American literature, Romantic poetry, and topics in literary criticism. Independent study may be arranged by consulting with an English instructor.

Members of the department are available to advise students. The major figure requirement, for example, may be met by successfully completing courses from among such offerings as Edgar Allan Poe, Ernest Hemingway, and Jane Austen, as well as Chaucer and Milton. The department regularly adds new courses to this area.

■ **The Minor**

Students who minor in English may concentrate in literature, writing, linguistics, or technical communication to supplement the major concerns of other disciplines. Interdisciplinary minors in linguistics and in technical communication are described in the Special Programs section of this bulletin. Within each minor, the student may select an individual course of study with the help of a faculty adviser.

■ **Related Programs**

See Cinema Studies Minor, International Programs, Irish Studies Program, Linguistics Minor, Media Studies Minor, Teacher Preparation Option, Technical Communication Minor, and Women's Studies Minor in the Special Programs section, which begins on page 86. See also *Nineteenth-Century Contexts*, *Studies in American Fiction*, and *The Scriblerian* in the section on journals, page 93.

Department of Modern Languages

Holbrook C. Robinson, Ph.D., *Associate Professor and Chairman*

| | | |
|-----------------------------|-----------------------------|--|
| <i>Professor</i> | Neil A. Larsen, Ph.D. | Robert B. Modee, M.A., <i>Executive Officer</i> |
| Constance H. Rose, Ph.D. | Bonnie S. McSorley, Ph.D. | |
| <i>Associate Professors</i> | Stephen A. Sadow, Ph.D. | <i>Instructors</i> |
| Lillian Bulwa, Ph.D. | John Spiegel, Ph.D. | Anthony P. Esposito, M.A. |
| Walter M. Gershuny, Ph.D. | <i>Assistant Professors</i> | Rita Schneider, M.A. |
| Juliette M. Gilman, Ph.D. | Deborah Arteaga, Ph.D. | |
| Inez Hedges, Ph.D. | Ross D. Hall, Ph.D. | |

Degrees Offered: Bachelor of Arts, Bachelor of Science

The study of modern languages can benefit all students, regardless of their major fields of interest. In the complex modern world, increased communication among varied and often divergent cultures is critical. It is important to understand and appreciate how the members of different cultures think. Language offers the key to understanding and may serve to help one achieve a more cosmopolitan, open-minded, and sensitive view of the world.

■ **Professional Preparation**

The department offers background preparation to students interested in elementary school, secondary school, or college teaching; international business relations; high-tech fields; government service; journalism; library science; world affairs; travel; and community service, especially in Spanish-speaking areas. (Those who wish to teach in college must plan on graduate study.)

■ **The Major**

Available in French, German, Italian, Russian, or Spanish, the major in modern languages normally requires advanced courses in two languages. The freshman year should be used to fulfill as many general requirements as possible and to begin study of the first, principal language. Students planning to study Russian or Italian should begin courses as early as possible; these courses are not offered on a regular basis.

Normally, the study of a second language begins in the second year. Students should take at least two language electives per quarter from the beginning of the second year. This pattern may be varied to fit the needs of the individual student.

The first and second language requirements are *minimum* requirements. Students are strongly encouraged to go beyond them, and even to pursue a third language.

The department is currently designing a one-language major. Students are urged to consult their department advisers for more information concerning this program and other possible curriculum changes.

The bachelor of arts is the principal degree offered. A bachelor of science is offered in French and Spanish. For either, the student must select a primary as well as a secondary language from appropriate departmental offerings.

Candidates for the B.A. must satisfy the college requirements for graduation and meet the departmental requirements in their major: 16 quarter hours in history (any history courses relevant to the major are acceptable), 8 quarter hours of Survey of English Literature, a minimum of 32 quarter hours of advanced work in the primary language, and 8 quarter hours of advanced work in the secondary language. Advanced work may be defined as any course beyond the intermediate level of the language.

Candidates for the B.S. degree must complete 8 quarter hours of composition and conversation in the first and second languages, 40 additional quarter hours of advanced work in the primary language and 16 additional quarter credits of advanced work in the secondary one.

■ **The Minor**

For students interested in acquiring proficiency in one foreign language as an adjunct to their major, the department offers a minor in modern languages, open to students of all colleges. The details of the requirements for a minor vary slightly from language to language, but in all cases the student is required to take a total of six courses. Generally, two composition and conversation courses, a civilization course, and an introductory course in literature are required. The remaining courses are free electives drawn from advanced courses offered by the department. Students are urged to consult the department adviser for more information about the minor.

■ **Facilities**

In the basic language courses, two half-hour sessions per week in the language laboratory are required. The language laboratory is available on an optional basis for advanced work. The department lounge is available to Modern Language students.

■ **Related Programs**

See American Sign Language Programs, Elementary Spanish Course for Criminal Justice and Human Services Majors, International Programs, Linguistics Minor, Russian Studies Minor, and Teacher Preparation Option in the Special Programs section, which begins on page 86.

Department of Philosophy and Religion

Michael R. Lipton, Ph.D., *Associate Professor and Chairman*

Professors

Walter L. Fogg, Ph.D.
Pavel Kovaly, Ph.D., C.Sc.
Stephen L. Nathanson, Ph.D.

Associate Professors

William J. DeAngelis, Ph.D.
Bart K. Gruzalski, Ph.D.
Edward A. Hacker, Ph.D.
Gordon E. Pruett, Ph.D.

Susan M. Setta, Ph.D.
Joseph H. Wellbank, Ph.D.

Lecturer

Michael C. Meyer, Ph.D.

Degrees Offered: Bachelor of Arts, Bachelor of Science

Philosophy includes questions and theories related to art, religion, morality, society, and natural and social sciences. The study of philosophy challenges students to examine their beliefs in many areas through critical reflection.

Through readings, discussion, and writing, students examine questions concerning the nature and validity of religious beliefs, moral judgments, and scientific theories, as well as questions of values and social policy in such areas as law, medicine, and technology.

■ Professional Preparation

Courses may help strengthen the student's work in other areas and provide an understanding of the methods and traditions of philosophical and religious thought. A major in philosophy may help students sharpen their critical abilities in preparation for graduate or professional study. Former philosophy majors can be found in the most diverse of professional careers.

■ The Major

The philosophy major offers students a balanced understanding of the nature of philosophy and particular philosophical problems that arise in the various arts and sciences.

All degree candidates must take at least 8 quarter hours in English and 52 quarter hours in the department and must meet the following specific requirements:

- Classical Greek Philosophy and Modern Philosophy;
- Introduction to Logic or Symbolic Logic (the department urges students contemplating graduate studies in philosophy to take Symbolic Logic);
- Theory of Knowledge or Metaphysics or Moral Philosophy;
- at least one seminar;
- 32 quarter hours of philosophy electives, selected in consultation with a departmental adviser.

■ Religion Program

The program in religion enables students to acquire an understanding of religious experience, both as an individual response and within its social, historical, literary, and political context. Specific religions are studied, as are the mythical and mystical dimensions of religious experience in general. Although a major is not offered in religion, the program offers a basic introduction to religious studies through introductory and intermediate-level courses.

■ The Minor

The minor in philosophy consists of 28 quarter hours. Specific requirements are as follows:

- an introduction to philosophy course;
- either Classical Greek Philosophy or Modern Philosophy;
- either Introductory Logic or Symbolic Logic;
- Moral Philosophy, Theory of Knowledge, Metaphysics, or Philosophy of Mind;
- three electives in philosophy.

■ Related Programs

See International Programs, Linguistics Minor, Teacher Preparation Option, and Women's Studies Minor in the Special Programs section, which begins on page 86.

Department of Speech Communication

Richard Katula, Ph.D., *Professor and Chairman*

Associate Professors

Carl W. Eastman, M.A.

Michael L. Woodnick, M.S.

Alan J. Zaremba, Ph.D.

Instructors

David Branco, Ph.D.

Joseph Castiglione, M.S.

David Knapp, M.S.

Lecturers

Thomas Shaker, M.A.

Philip Sirkin, M.B.A.

Assistant Professors

Karen S. Buzzard, Ph.D.

Joanne Morreale, Ph.D.

Degrees Offered: Bachelor of Arts, Bachelor of Science

The Department of Speech Communication stimulates personal and professional growth through a study of the principles and methods of communication. Courses aid students in understanding the process and functions of communication in society. The program helps students to increase their self-awareness and heighten personal development through theoretical and experiential learning opportunities.

■ Professional Preparation

The objectives of the speech communication major are to help students:

- grow and develop self-expression through the study of historical, contemporary, and artistic aspects of speech and communication, and to provide organized knowledge and critical insight;
- prepare for professions that require a theoretical and technical knowledge of communication, such as broadcasting, law, public service, advertising and industrial communication, government relations;
- prepare for advanced graduate study in communication and other professional fields.

■ The Major

Students may tailor their programs to satisfy their personal and professional needs. They may concentrate in radio and television; interpersonal and organizational communication; research and theory; rhetoric, advocacy, and public address; and general speech. The department also offers directed-study and internship programs.

Directed Study Working with a faculty adviser, a student selects and completes a research or performance project. Generally commensurate with the work load of a one-quarter course, directed-study projects deal with such areas as surveying and interpreting communicative behavior, studying the rhetoric of political campaigns, and the effects of the media on society.

Internship Program The internship program offers students field experiences that complement or implement their classroom training. Distinct from the co-op plan, the internship program provides academic credit for unpaid, part-time, on-site activities during the student's academic quarters. Internships often result in the student's placement in active roles in commercial broadcasting studios, advertising firms, and governmental agencies.

■ The Minor

Students may develop a minor in speech communication that complements their academic major by selecting appropriate courses with the aid of a speech communication faculty adviser. The following four core courses are required of all minors: Introduction to Communication Theory, Business and Professional Speaking, Interpersonal Communication I, and Group Discussion.

Individual needs and specific goals may be met by selecting four additional electives. Recommended elective groupings have been developed for students concentrating in management, marketing, elementary or secondary education, human or social services, political science, sociology, psychology, and journalism.

■ Related Programs

See Cinema Studies Minor, International Programs, Media Studies Minor, Teacher Preparation Option, and Technical Communication Minor in the Special Programs section, which begins on page 86.

Sciences and Mathematics

The natural and physical sciences analyze the nature and properties of energy and matter. Since most hypotheses are tested using numerical measurements, mathematics provides the theoretical underpinnings for much data analysis.

The sciences and mathematics focus on understanding the fundamental properties of a system or of principles that govern a system. These essentials of knowledge—whether operative in structure, organization, or process—provide the means by which we understand the world around us. The science and mathematics program is comprised of biology, chemistry, geology, mathematics, and physics.

Department of Biology

David C. Wharton, Ph.D., *Professor and Acting Chairman*

Professors

Gwilym S. Jones, Ph.D.
Charles A. M. Meszoely, Ph.D.
M. Patricia Morse, Ph.D.
Fred A. Rosenberg, Ph.D.
Ernest Ruber, Ph.D.
Kenneth P. Sebens, Ph.D.
Phyllis R. Strauss, Ph.D.
Carol Warner, Ph.D.

Associate Professors

Joseph L. Ayers, Ph.D.
Kostia Bergman, Ph.D.

Donald P. Cheney, Ph.D.
Charles H. Ellis, Jr., Ph.D.
Aileen F. Knowles, Ph.D.
Helen H. Lambert, Ph.D.
Richard L. Marsh, Ph.D.
Susan Powers-Lee, Ph.D.
Daniel C. Scheirer, Ph.D.
Henry O. Wernitz, Ph.D.

Assistant Professors

John W. Bodnar, Ph.D.
Frederick C. Davis, Ph.D.
H. William Dietrich, Ph.D.
Jacqueline M. Piret, Ph.D.

Maryellen Polvino-Bodnar,
Ph.D.

Wendy A. Smith, Ph.D.
Jon D. Witman, Ph.D.

Professors Emeriti

Charles Gainor, Ph.D.
Nathan W. Riser, Ph.D.

Adjunct Professor

Bruce B. Collette, Ph.D.

Adjunct Assistant Professor

Barbara L. Thorne, Ph.D.

Degrees Offered: Bachelor of Arts, Bachelor of Science

The biology major enables students to develop a basic understanding of the organization and the processes of life, from molecules and cells through organs and organ systems to populations, species, ecosystems, and evolution. The major offers the mathematical, chemical, and physical background to understand biology and to gain practical scientific skills associated with each of these areas. It allows students to begin to specialize in a subdiscipline of biology.

■ Professional Preparation

The biology major provides preparation for careers in the life sciences including medical, dental, and other health-related fields. Graduate study leading to a master's or doctoral degree can open careers in upper-level teaching and/or research

in areas such as zoology, botany, microbiology, physiology, ecology, marine biology, cell biology, molecular biology, or biochemistry. Biology majors may also pursue postgraduate training in areas such as nutrition, public health, or medical technology.

Students who do not wish to enter graduate schools may find employment in federal, state, industrial, hospital, or university laboratories doing research, survey, or quality control in a biological area. They may also be able to enter directly into positions in industries involved in the manufacture and distribution of pharmaceuticals, biological products, food, or scientific equipment. Many biologists are employed in fisheries, forestry services, county and state agencies, museums, aquariums, research vessels, and marine stations.

Premedical or pre dental students are urged to consult with the preprofessional advisory committee early in their careers at Northeastern. *Successful completion of the required preprofessional courses by no means ensures admission to a professional school. Other factors are involved.*

■ The Major

The major consists of ten biology courses in addition to chemistry, physics, and mathematics. Six courses constitute the required “Biocore”: Principles of Biology I, II, and III; Environmental and Population Biology; Genetics and Developmental Biology; and Cell Physiology and Biochemistry. The other four biology courses may be chosen from upperclass biology electives that require some or all of the Biocore as prerequisites. It is usually possible to follow the prescribed sequence if a student decides on the major in the freshman or sophomore year. Students who enter the major in the middler year may complete the major in the normal time by taking some of the electives concurrently with the Biocore courses.

To graduate with a major in biology, a student must have a cumulative quality-point average (QPA) of 2.0 for all science and mathematics courses required for the major. Both the bachelor of arts and the bachelor of science degrees require a modern language. The B.S. program is more extensive in its mathematics and science requirements and may offer better preparation for some areas of postgraduate study.

After completing the Biocore, students interested in independent research may arrange to undertake directed study. If eligible, they may be invited to undertake a more extensive honors program involving up to four quarters of research.

The department publishes a booklet, *The Biology Undergraduate Advisory Book*, which explains the required and recommended courses and the QPA standards in science for biology majors. The *Advisory Book* is available in the Office of Biology, 414 Mugar Hall. Students intending to major in biology should obtain a copy as early as possible after enrollment. Biology majors wishing to pursue a minor in another field should see their biology adviser as early in their program as possible.

■ The Minor

A minor in biology consists of any six biology courses for which the student has the prerequisites, plus two more courses that serve as prerequisites for biology courses. At least five of the total eight courses must include laboratory. A student may not count toward the biology minor more than one course, or course sequence, that covers substantially the same material.

Each student's biology minor program must receive the signed approval of the biology minor's adviser. A QPA of 2.0 must be achieved for those courses used to satisfy the minor requirements. Courses taken on a pass/fail basis are not acceptable for minor credit.

■ Facilities

The Department of Biology has teaching laboratories for general biology, botany, anatomy, microbiology, microscopy, physiology, zoology, cell biology, molecular biology, and biochemistry. Equipment for fieldwork, museum specimens, models, and charts are employed in laboratory instruction. Additional facilities include aquarium and animal rooms, stockrooms, preparation rooms, research areas, a vertebrate museum and herbarium, and a large suburban greenhouse and woodlot. The department has a close association with the University's Electron Microscopy Center and the Marine Science Center in Nahant (see page 212).

■ Related Programs

See Combined Program with Preprofessional Schools, East/West Marine Biology Program, International Programs, Marine Science Center Summer Program in Marine Biology, Marine Studies Minor, Massachusetts Bay Marine Studies Consortium, School for Field Studies Affiliation, and Teacher Preparation Option in the Special Programs section, which begins on page 86. See also information on the instrumentation for science minor in the Physics section, page 72.

Department of Chemistry

Philip M. Warner, Ph.D., *Professor and Chairman*

Professors

Geoffrey Davies, Ph.D.
David A. Forsyth, Ph.D.
Bill C. Giessen, Dr.Sc.Nat.
Robert N. Hanson, Ph.D.*
Barry L. Karger, Ph.D.
Philip W. Le Quesne, Ph.D.,
D.Sci.
John L. Neumeyer, Ph.D.*
Mary J. Ondrechen, Ph.D.

William M. Reiff, Ph.D.
John L. Roebber, Ph.D.
Alfred Viola, Ph.D.
Paul Vouros, Ph.D.

Associate Professors
Thomas R. Gilbert, Ph.D.
Conrad M. Jankowski, Ph.D.
Ira S. Krull, Ph.D.
Kay D. Onan, Ph.D.

Robert N. Wiener, Ph.D.
Lawrence D. Ziegler, Ph.D.

Assistant Professor
Rein U. Kirss, Ph.D.

Professor Emeritus
Robert F. Raffauf, Ph.D.*

Supervisor of Laboratories
Bernard J. Lemire, B.S.

Degrees Offered: Bachelor of Arts, Bachelor of Science

Chemistry is concerned with the structure and properties of substances and with the transformations they undergo. The educational objectives of the Department of Chemistry are to help students:

- experience the intellectual stimulation of studying a physical science;
- grasp the basic principles and techniques of chemistry-related careers;
- prepare for graduate study in chemistry or related fields.

■ Professional Preparation

Challenging career opportunities exist in technical fields in which research, development, production, sales, market analysis, quality control, and management are involved. Chemistry major programs are based on a career-oriented concept and enable students to prepare for the study of medicine and dentistry and for advanced study in many fields of science.

Alumni have pursued careers such as chemical sales and management; clinical, medicinal, pharmaceutical, and forensic chemistry; geochemistry, mineralogy, and environmental chemistry; medicine; dentistry; industry; teaching and research.

*Joint appointment with College of Pharmacy and Allied Health Professions

■ The Major

The Department of Chemistry has a total of about 30 students throughout all levels. Since classes are small, there is considerable interaction between faculty and students. The two undergraduate degrees differ mainly in their arts and sciences content and advanced science course requirements.

Courses in English, calculus, physics, and basic chemistry are taken in the freshman year. Students may be exempted from the general chemistry courses by passing equivalency tests. In this case, other courses are substituted. In the upperclass years, students take courses in inorganic, organic, physical, and analytical chemistry. For the B.S. degree, some additional advanced mathematics and science courses are required. German or Russian is strongly recommended for students who plan to pursue graduate study in the sciences.

Qualified students are encouraged to undertake a research program under the supervision of a faculty member. An honors program is open to especially able students.

The department publishes an informational booklet, *Chemistry at Northeastern*, which describes the chemistry major curriculum and requirements in detail. Interested students may obtain a copy in the main office of the Department of Chemistry, 102 Hurtig Hall, or from the Department of Undergraduate Admissions, 150 Richards Hall.

■ The Minor

The minor program consists of courses in general, analytical, organic, and physical chemistry. Further information may be obtained from the Department of Chemistry, 102 Hurtig Hall.

■ Facilities

The main facilities of the department are housed in Hurtig Hall, a modern, air-conditioned, five-story building. Faculty offices are there, as is the James Flack Norris Room, a lounge for undergraduate chemistry majors. Additional research facilities are located in the Barnett Institute (see page 211). The department's major research equipment includes electron microscopes, mass spectrometers, lasers, X-ray diffractometers, nuclear magnetic-resonance spectrometers, Gouy and Faraday magnetic balances, Mössbauer spectrometers, and a variety of ultraviolet and infrared spectrometers. Undergraduate students taking advanced courses or working on research projects may use certain of these instruments.

■ Accreditation

Chemistry programs at Northeastern are approved by the American Chemical Society (A.C.S.). The B.S. degree meets the society's requirements for certification. Certified graduates are eligible for full membership in the A.C.S. after two years of experience.

■ Related Programs

See Combined Program with Preprofessional Schools, International Programs, Marine Studies Minor, School for Field Studies Affiliation, and Teacher Preparation Option in the Special Programs section, which begins on page 86. See also information on the instrumentation for science minor in the Physics section, page 72.

Department of Geology

Richard H. Bailey, Ph.D., *Associate Professor and Chairman*

Professors

Richard S. Naylor, Ph.D.

William A. Newman, Ph.D.

Associate Professors

Bernard L. Gordon, M.S.

Peter S. Rosen, Ph.D.

Martin E. Ross, Ph.D.

Assistant Professor

Malcolm D. Hill, Ph.D.

Degrees Offered: Bachelor of Arts, Bachelor of Science

The department offers degree programs in geology and environmental geology. Geology deals with the study of the physical features, composition, history, and processes of the earth. Today many geologists are working on developing and protecting our water resources as well as seeking sources of mineral deposits and fossil fuels.

■ Professional Preparation

The geology program offers basic knowledge for working in almost any of the geological professions, in both industry and government. Graduates work for geotechnical, consulting, or engineering firms, studying environmental problems or analyzing proposed new construction sites. A number also work in the oil industry and for government agencies.

■ The Major

During their first two years, students should complete courses in chemistry, physics, biology, and mathematics along with physical and historical geology. Students complete the geology core by taking petrology and geomorphology. In addition to the geology core, students choose a minimum of 11 geology courses (3 required, 8 elective) for the bachelor of science degree or 7 courses (2 required, 5 elective) for the bachelor of arts degree. Although not required, courses in stratigraphy, petrology, structural geology, and paleontology are usually among the electives chosen by undergraduates.

During the junior and senior years, students may select undergraduate research as an elective. Under faculty supervision, a problem is selected, defined, and researched.

■ The Minor

The Department of Geology offers minors in geology and in environmental geology. More information may be obtained by contacting the department chair.

■ Field Trips

A sound geological education must include first-hand experience in the field and direct observation of geological phenomena. Whenever appropriate, fieldwork on an individual or group basis will be part of courses.

■ Related Programs

See East/West Marine Biology Program, International Programs, Marine Studies Minor, School for Field Studies Affiliation, and Teacher Preparation Option in the Special Programs section, which begins on page 86. See also information on the instrumentation for science minor in the Physics section, page 72.

Department of Mathematics

Margaret B. Cozzens, Ph.D., *Professor and Chairperson*

| <i>Professors</i> | <i>Associate Professors</i> | <i>Assistant Professors</i> |
|-----------------------------|-----------------------------|-----------------------------|
| Samuel J. Blank, Ph.D. | Mark Bridger, Ph.D. | Florin Abram, Ph.D. |
| Bohumil Cenkľ, Sc.D. | Robert W. Case, Ph.D. | David Bernstein, Ph.D. |
| David I. Epstein, Ph.D. | Stanley J. Eigen, Ph.D. | Mo-suk Chow, Ph.D. |
| Holland C. Filgo, Ph.D. | John Frampton, Ph.D. | Jennie Hansen, Ph.D. |
| Terence Gaffney, Ph.D. | Eugene Gover, Ph.D. | Christopher King, Ph.D. |
| Alberto R. Galmarino, Ph.D. | Samuel Gutmann, Ph.D. | N. V. R. Mahadev, Ph.D. |
| Maurice E. Gilmore, Ph.D. | Solomon M. Jekel, Ph.D. | Alex Martinskovsky, Ph.D. |
| R. Mark Goresky, Ph.D. | Donald R. King, Ph.D. | Carla B. Oblas, M.S. |
| Arshag B. Hajian, Ph.D. | Nishan Krikorian, Ph.D. | Samuel Stueckle, Ph.D. |
| Anthony Iarrobino, Ph.D. | Venkatrama Lakshmibai, | Alexandru Suciu, Ph.D. |
| Marc Levine, Ph.D. | Ph.D. | |
| Richard Porter, Ph.D. | Robert C. McOwen, Ph.D. | <i>Lecturer</i> |
| Fred Roberts, Ph.D. | Mark Ramras, Ph.D. | John Fox, M.S. |
| Jayant Shah, Ph.D. | Egon Schulte, Ph.D. | |
| Gabriel Stolzenberg, Ph.D. | Martin Schwarz, Ph.D. | |
| Chuu-Lian Terng, Ph.D. | Thomas O. Sherman, Ph.D. | |
| Dung Tranghe, Ph.D. | Gordana G. Todorov, Ph.D. | |
| Jack Warga, Ph.D. | Jerzy Weyman, Ph.D. | |
| | Andre Zelwinsky, Ph.D. | |

Degrees Offered: Bachelor of Arts, Bachelor of Science

Mathematics has become the foundation and a rich source of methods for most science and technology. Mathematicians possess the skill to analyze the crucial features of many diverse problems and apply rigorous techniques to solve them. The Department of Mathematics allows students to develop and expand their abilities in this exact science.

■ Professional Preparation

Mathematical training may lead to opportunities in applied research (natural sciences, engineering, economics, management, computer science) as well as mathematical research, teaching, and/or industry.

■ The Major

The bachelor of arts program requires a minimum of 13 mathematics courses and a foreign language requirement. Because mathematics-related material is often written in French, German, Italian, or Russian, one of these languages is recommended. The bachelor of science requires a minimum of 16 mathematics courses but does not require the study of a foreign language.

By the end of the sophomore year, all students should complete a basic sequence of mathematics courses in the calculus of one and several variables, differential equations, combinatorics, some linear algebra, and numerical methods. Although a computer programming course is not required, students will be expected to learn the basic programming skills necessary for numerical solutions of complex problems.

A transition from the basic sequence to more advanced parts of the curriculum is provided by Analysis I–II and Advanced Linear Algebra I, which are prerequisites for many advanced courses in applied analysis, complex analysis, topology, and foundations. Students planning to take many mathematics courses should take Analysis I–II and Advanced Linear Algebra I in the middler year. Students may wish to take a prerequisite for more advanced courses in algebra and/or one that includes linear, nonlinear, and dynamic programming. Courses in probability, statistics, and numerical analysis may also be taken after the basic sequence.

■ **The Minor** The department is in the process of developing a minor.

■ **Certification**

On October 1, 1994, Massachusetts will institute a two-stage teacher certification process. Students planning to teach secondary school mathematics can complete the requirements for application to the first stage, Provisional Certification, while they are undergraduates. Such students must major in mathematics and take a specific minor in Education, which includes course work and practice teaching.

■ **Related Programs**

See International Programs, Linguistics Minor in the Special Programs section, which begins on page 86. See also information on the instrumentation for science minor in the Physics section on page 72, and computer science major (many students do a double major in mathematics and computer science) on page 130.

Department of Physics

Stephen Reucroft, Ph.D., *Professor and Chairman*

| | | |
|----------------------------|-------------------------------|-----------------------------|
| <i>Professors</i> | Pran Nath, Ph.D. | <i>Assistant Professors</i> |
| Ronald Aaron, Ph.D. | Clive H. Perry, Ph.D. | Narendra K. Jaggi, Ph.D. |
| Petros N. Argyres, Ph.D. | Carl A. Shiffman, Ph.D. | Alain S. Karma, Ph.D. |
| Arun Bansil, Ph.D. | Jeffrey B. Sokoloff, Ph.D. | Jacqueline Krim, Ph.D. |
| Paul M. Champion, Ph.D. | Yogendra N. Srivastava, Ph.D. | Ian Leedom, Ph.D. |
| Alan H. Cromer, Ph.D. | Michael T. Vaughn, Ph.D. | Russell LoBrutto, Ph.D. |
| William L. Faissler, Ph.D. | Eberhard von Goeler, Ph.D. | Srinvas Sridhar, Ph.D. |
| Marvin H. Friedman, Ph.D. | Allan Widom, Ph.D. | Tomasz Taylor, Ph.D. |
| David A. Garelick, Ph.D. | Fa Yueh Wu, Ph.D. | <i>Professor Emeritus</i> |
| Michael J. Glaubman, Ph.D. | <i>Associate Professors</i> | Eugene J. Saletan, Ph.D. |
| Haim Goldberg, Ph.D. | George O. Alverson, Ph.D. | |
| Walter Hauser, Ph.D. | Marie E. Machacek, Ph.D. | |
| Jorge V. José, Ph.D. | Robert S. Markiewicz, Ph.D. | |
| Bertram J. Malenka, Ph.D. | | |

Degrees Offered: Bachelor of Arts, Bachelor of Science

Physics is concerned with fundamental principles that govern natural phenomena, ranging in scale from collisions of subatomic particles through the behavior of solids and liquids to exploding stars and colliding galaxies.

The objectives of the physics undergraduate programs are to help students:

- experience the intellectual stimulation of studying physics and astrophysics;
- experience the excitement of front-line research programs;
- understand the basic principles and techniques of physics-related careers;
- prepare for graduate study in physics or related fields.

■ **Professional Preparation**

In addition to work in industrial, government, and high-technology laboratories in areas of applied physics, students may find opportunities in such fields as biophysics, computer sciences, geophysics, medical and radiation physics, and engineering. Many students majoring in physics go on to pursue advanced degrees in physics and related fields.

The department offers four levels of undergraduate courses:

- descriptive courses for non-science majors with limited mathematical backgrounds;
- general survey courses for students in scientific and engineering fields;
- advanced courses intended mainly for physics majors;
- highly advanced courses intended mainly for prospective graduate students.

The co-op program allows students to alternate between classroom and off-campus work experiences in research and professional organizations throughout the United States. In a number of cases, physics majors work on co-op with a high-technology company and then return to school and work with a related aspect in one of the research programs of the department either for credit or as work-study.

■ The Major

The freshman-year program for all physics majors includes a three-quarter physics sequence common to all science and mathematics majors and a three-quarter calculus sequence. The remaining freshman courses are from the college core curriculum.

Beyond the survey courses in physics and mathematics, B.A. students are required to pass the two second-year intermediate physics courses, three upper-division lecture courses, three upper-division laboratory courses, as well as one upper-division mathematics elective. The B.A. program is flexible and allows students to pursue other interests in depth.

Candidates for either of the B.S. physics degrees must complete the two intermediate physics courses, the second year of the calculus sequence, and a year of differential equations. In addition, the B.S. candidates must satisfy the appropriate college requirements as well as seven upper-division physics lecture courses, three upper-division physics laboratory courses, and five additional technical electives (from the sciences, mathematics, or engineering departments). The B.S. in physics program is most appropriate for those who wish to pursue graduate study in physics.

In addition to the intermediate-level courses described, candidates for the B.S. degree in applied physics must complete three upper-division physics lecture courses, five upper-division physics laboratory courses, three computer science courses, and four additional technical electives. The B.S. in applied physics program is most appropriate for students who expect to proceed directly to work after the B.S. degree or who expect to go to graduate school in related fields.

The upper-division lecture courses offered by the department include Astrophysics, Electromagnetic Theory, Mathematical Physics, Mechanics, Nuclear Physics, Quantum Mechanics, Solid State Physics, Thermodynamics, and Wave Motion and Optics. The upper-division laboratories include Wave Motion, two quarters of Electronics, a laboratory devoted to microcomputer programming and interfacing, and a special project laboratory in which the student designs and carries out a complete project involving either instrumentation or computational physics.

■ The Minors

The Department of Physics offers the physics minor and the instrumentation for science minor. To fulfill the requirements of the physics minor, a student must take four intermediate and/or advanced courses after completing introductory physics. Computer science and engineering students may have slightly different requirements for a physics minor.

The instrumentation for science minor offers experience in the use of common laboratory instruments, the taking and analysis of data, and elementary skills in electronics. A major goal of the minor is to prepare the student to design and construct relatively small-scale special-purpose measurement instrumentation. To fulfill the requirements of the minor a student must take four intermediate and/or advanced laboratory courses after completing introductory physics.

Further information on the minor programs may be obtained from the Department of Physics, 112 Dana Research Center.

■ Honors Program

Undergraduate students invited into the Honors Program may take graduate courses, reading courses, and special topics courses, by petition, in the various research fields of the department. Such work occasionally leads to presentation of papers at professional meetings and to publication in professional journals. For more information on the University Honors program, see pages 18–19.

■ Facilities

The Department of Physics is housed in the Dana Research Center, a modern, air-conditioned building with a library; research laboratories, department and student machine shops; electronics shop; conference and seminar rooms; and faculty, graduate, undergraduate student offices. The department has its own computer facility, including several computers dedicated to individual physics research projects. In addition, a department terminal cluster provides access to the VAX 8650 in the University Computer Center as well as to a number of other computers.

Besides working at the research facilities on campus, faculty and graduate students pursue research at a variety of off-campus facilities: high-energy physics experiments at the Stanford Linear Accelerator Center (SLAC), Palo Alto, California, at CERN, Geneva, Switzerland, and at the Fermi National Accelerator Laboratory (Fermilab), Batavia, Illinois; high magnetic field experiments at the National Magnet Laboratory, Cambridge, Massachusetts; and inelastic neutron scattering experiments at the Brookhaven National Laboratory, New York, at the Oak Ridge National Laboratory, Oak Ridge, Tennessee, and at the Laue-Langevin Institute, Grenoble, France.

The department's full-time faculty members are involved in a broad spectrum of front-line experimental and theoretical programs in astrophysics, atomic and molecular physics, biophysics, elementary particle physics, and solid state and low temperature physics. A full description of these programs may be obtained on request to the chair of the department.

■ Related Programs

See International Programs, Marine Studies Minor, and Teacher Preparation Option in the Special Programs section, which begins on page 86.

Social Sciences

The social sciences examine human groups and the actions and consequences of individual and collective behaviors. These fields focus on people and base their study on objective analyses of systematically gathered data. The social science disciplines are united by the desire to comprehend the underlying regularities and relationships that characterize the social world. In attending to human experience, the social sciences bear a relationship to the humanities; in method, they are closer to the natural sciences.

The social sciences at Northeastern are comprised of African-American studies, economics, history, human services, linguistics, political science, psychology, and sociology/anthropology.

Department of African-American Studies

Ronald W. Bailey, Ph.D., *Professor and Chairman*

| | | |
|-----------------------------|--------------------------------|---------------------------|
| <i>Professors</i> | William Lowe, M.A. | <i>Associated Faculty</i> |
| Patrick Manning, Ph.D. | <i>Music</i> | Donald M. Jacobs, Ph.D. |
| <i>History</i> | Joseph D. Warren, Ph.D. | <i>History</i> |
| <i>Associate Professors</i> | <i>Social Welfare</i> | Joyce Scott, Ed.D. |
| Abdul Alkalimat, Ph.D. | <i>Assistant Professors</i> | <i>Literature</i> |
| <i>Sociology</i> | Leonard Brown, Ph.D. | Herman S. Gray, Ph.D. |
| Holly M. Carter, Ph.D. | <i>Music</i> | <i>Sociology</i> |
| <i>Political Science</i> | Elizabeth Freydborg, M.A. | William F. Miles, Ph.D. |
| Jordan Gebre-Medhin, Ph.D. | <i>Theatre</i> | <i>Political Science</i> |
| <i>Anthropology</i> | Kwamina Panford, Ph.D. | Oscar Brookins, Ph.D. |
| Maryemma Graham, Ph.D. | <i>Law, Policy and Society</i> | <i>Economics</i> |
| <i>Literature</i> | <i>Instructors</i> | |
| Robert L. Hall, Ph.D. | Clark White, M.A. | |
| <i>History</i> | <i>Sociology</i> | |

Degrees Offered: Bachelor of Arts, Bachelor of Science

African-American studies exposes students to the experiences of African-American people and other of African descent. The curriculum reflects an interdisciplinary approach, based on the fields outlined by The National Council of Black Studies: historical, social-behavioral, and cultural studies. International studies, public policy, and the impact of science and technology are integral parts of the program.

Students apply theoretical knowledge to real world problems and concerns. Students with training in African-American studies will have skills to meet the challenges posed by the diversity of racial, cultural, and ethnic groups, in the United States and abroad.

■ Professional Preparation

African-American studies graduates often attend professional school and teach at the secondary or college level. Others work in museums, libraries, research centers, social service agencies, business, public service, and social welfare and law enforcement agencies.

■ The Major

Students take 15 courses in the major: six African-American studies core courses, five courses in their field of concentration and a two-course sequence in each of two fields other than the area of concentration. One of these two-course sequences should be thematic: i.e., social change, public history, modern poetry, international relations, or media.

Students are encouraged to participate in activities such as the African-American Studies Club, the annual student delegation to the Model Organization of African Unity meeting at Howard University, trips to professional conferences, visits to local museums and historical sites, and ongoing research projects and programs.

■ The Minor

To qualify for a minor, a student must earn 28 quarter hours in the field. Required courses include Introduction to African-American Studies, Foundations of Black Culture, Black Community and Social Change, a historical survey course, a course on the Black Experience outside the United States, a senior seminar, and one elective.

■ Related Programs

See Human Services (page 77). See also Independent Major, International Programs, Teacher Preparation Option, and Women's Studies Minor in the Special Programs section that begins on page 86.

Department of Economics

Professors

Conrad P. Caligaris, Ph.D.
Harold M. Goldstein, Ph.D.
Daryl A. Hellman, Ph.D.
Irwin L. Herrnstadt, Ph.D.
Sungwoo Kim, Ph.D.
Steven A. Morrison, Ph.D.
Gustav Schachter, Ph.D.
Andrew M. Sum, M.A.

Associate Professors

Neil O. Alper, Ph.D.
Bruce R. Bolnick, Ph.D.
Oscar T. Brookins, Ph.D.
Kamran N. Dadkhah, Ph.D.

Alan W. Dyer, Ph.D.
Barbara M. Fraumeni, Ph.D.
Gregory Wassall, Ph.D.

Assistant Professors

M. Shahid Alam, Ph.D.
Gopa Chowdhury-Bose, Ph.D.
Jonathan H. Haughton, Ph.D.
Teh M. Huo, Ph.D.
Manfred W. Keil, Ph.D.
Fred K. Luk, Ph.D.
George A. Plesko, Ph.D.

Lecturers

Gustavo Aristizabal, M.A.

Caroline Beetz, M.A.
Michelle Casario, M.A.
Shi-Feng Chuang, M.A.
Golam M. Farooque, M.A.
Paul Harrington, M.A.
Mohammad S. Hasan, M.A.
Gerard Kambou, M.A.
Raht Ketusingha, M.A.
Kamlesh Misra, M.A.
Neeta Parekh-Fogg, M.A.
Dene Tin Tun, M.A.
Mark K. Tomass, M.A.

Professor Emeritus

Morris A. Horowitz, Ph.D.

Degrees Offered: Bachelor of Arts, Bachelor of Science

Economics is the study of ways in which scarce human resources are deployed to satisfy the material wants of individuals and society. Economists analyze the factors that determine the success or failure of this process.

■ Professional Preparation

The economics program provides the opportunity for students to obtain a better understanding of how our economy and other economies function, to prepare for graduate study in economics, and to develop specialties that may qualify them to work as economists.

Macroeconomics, concerned with the overall economy, deals with such problems as inflation; unemployment; growth and instability; and government monetary, fiscal, and regulatory policies. Microeconomics is concerned with the economic behavior of individuals, households, firms, and industries. It seeks to assess the economic effects of racism, sexism, pollution, and environmental damage and analyzes the economic aspects of natural resources, poverty, health, income distribution, trade unions, and collective bargaining.

Graduates may be employed in industrial relations, planning and forecasting, determining plant locations, and making financial studies. They may become expert in analyzing consumer demand and developing and marketing new products. They may conduct research, teach, or provide specialized consulting services. Federal, state, and local governments and trade unions are important sources of jobs for economists.

A baccalaureate economics degree or graduation with a number of advanced economics courses offers students an opportunity to prepare for graduate programs in economics as well as for entry into schools of law and business.

■ The Major

A student expecting to major in this field should take the problem-oriented course Principles of Economics in the freshman or sophomore year to discover the range of insights economics can offer in analyzing and solving a variety of problems. Upper-class courses apply theory to an in-depth study of a specific area of the field.

Other courses for the major include two quarters each of fundamentals of mathematics, economic statistics, and economic theory. In addition, the department offers electives in many areas of economics, honors courses, and reading courses.

The courses listed above are required for either the bachelor of arts or the bachelor

of science degree. The B.A. follows the liberal arts tradition in its core curriculum and language requirements—the Department of Economics requires social science courses as well, plus six economics electives and a course in the mastery of economic thought. The B.S. is a professional degree. In addition to its core curriculum requirements and social science electives, it requires ten economics electives and one course in econometrics or research methods.

Courses offer training in economic theory, money and banking, public finance, international trade, growth and development, industrial organization, comparative economic systems, economics of energy, environmental economics, economics of crime, urban problems, labor economics, human resources, economics of transportation, poverty and discrimination, and medical economics. In addition, tool courses such as statistics, mathematical economics, and econometrics are available. Other electives and reading courses permit students to study a particular area in depth.

■ **The Minor**

The department offers a minor consisting of four required courses and four electives, which are selected in consultation with a faculty adviser. Any course taken outside the Department of Economics to satisfy these minor elective requirements must be approved by a faculty adviser in the department.

■ **Related Programs**

See Business German, French for Business and Economics Students, International Programs, Russian Studies Minor, and Teacher Preparation Option in the Special Programs section, which begins on page 86.

Department of History

Raymond H. Robinson, Ph.D., *Professor and Chairman*

| | | |
|-------------------------------|-------------------------------|------------------------------|
| <i>Professors</i> | Patrick Manning, Ph.D. | Norbert L. Fullington, Ph.D. |
| Philip N. Backstrom, Ph.D. | Anthony N. Penna, D.A. | Christina Gilmartin, Ph.D. |
| Ballard C. Campbell, Ph.D. | John D. Post, Ph.D. | Clay McShane, Ph.D. |
| William M. Fowler, Jr., Ph.D. | <i>Associate Professors</i> | <i>Assistant Professors</i> |
| Harvey Green, Ph.D. | Charmarie J. Blaisdell, Ph.D. | Ruth-Ann M. Harris, Ph.D. |
| Donald M. Jacobs, Ph.D. | Laura L. Frader, Ph.D. | Gerald H. Herman, M.A. |

Degrees Offered: Bachelor of Arts, Bachelor of Science

History’s concern with the diverse and complex past of humanity provides an excellent opportunity for the development of greater understanding and appreciation of today’s cultures and civilizations.

■ **Professional Preparation**

Traditionally, history as a major has appealed to students desiring a broad base for careers in business, law, journalism, and government.

Other history majors want to work more directly in history. Those who want to teach in public schools may elect education courses that may lead to state certification (see page 100). Those desiring jobs in private secondary schools need not be certified by state authorities. Teaching positions in colleges and universities require master’s degrees and, increasingly, doctorates. Undergraduates who major in history facilitate their entrance to graduate programs in the field.

Some professional historians teach and write; others work in public archives, private historical societies, museums, and restoration projects. These careers serve not only other professional historians but a larger public as well.

■ **The Major**

Since the B.A. requires a foreign language, it appeals to prospective candidates for graduate school, where reading knowledge of foreign languages is often necessary; the B.S. is designed for students desiring a social science orientation and greater specialization in history.

Candidates for both degrees are required to take Western Civilization I and II, American History I and II, and The Historian's Craft, which focuses on methods, problems, and philosophies of historians. A later course, Approaches to History, requires students to undertake a major historical project. Elective courses cover the political, economic, social, and cultural history of humanity in diverse times and places.

The history requirements are divided into groups: Group A (ancient, medieval, and early modern Europe); Group B (modern Europe); Group C (British North American colonies and the United States); and Group D (other areas or regions). A minimum of two courses (eight quarter hours) must be elected from each group.

Students are urged to avoid overspecialization at the undergraduate level. Although there are no maximum limits on the amount of history that may be taken, the department advises broad course selection as the best policy. To ensure a broad program of study, the College of Arts and Sciences requires that students choose courses offered by departments outside the area of the major.

Students who qualify are urged to consider the honors program in history. Those accepted write honors theses under the direction of members of the department. Students ordinarily register for honors courses in their last three quarters of enrollment, except for the summer quarter, when honors courses are not usually offered.

■ **The Minor**

The history minor requires eight courses, two of which must be chosen from the introductory Western Civilization and American History courses. The remaining six may be selected from the list of history offerings. For more information or advice, students should contact the chairman of the History Department.

■ **Related Programs**

See Asian Studies Minor, International Programs, Irish Studies Program, Russian Studies Minor, Teacher Preparation Option, and Women's Studies Minor in the Special Programs section, which begins on page 86. See also *New England Quarterly* in the section on journals, page 93.

Human Services

John D. Herzog, Ph.D., *Department of Education, Acting Director and Professor*
Wilfred E. Holton, Ph.D., *Department of Sociology, Director and Associate Professor*

| | | |
|-------------------------------|-------------------------------|----------------------------------|
| <i>Advisory Committee</i> | Lawrence Litwack, Ed.D., | Harold S. Zamansky, Ph.D., |
| Wilfred E. Holton, Ph.D. | <i>Counseling Psychology,</i> | <i>Psychology</i> |
| Maureen E. Kelleher, Ph.D. | <i>Rehabilitation, and</i> | <i>Fieldwork Supervisor</i> |
| Gordana Rabrenovic, Ph.D., | <i>Special Education</i> | Natalie H. Riffin, M.Ed., O.T.R. |
| <i>Sociology/Anthropology</i> | Barbara Schram, Ed.D., | |
| Louise La Fontaine, Ed.D. | <i>Education</i> | |

Degrees Offered: Bachelor of Arts (Arts and Sciences),
Bachelor of Science in Education (Boston-Bouv )

Human services is an interdisciplinary major involving the Boston-Bouv  College of Human Development Professions and the College of Arts and Sciences. It may

lead to many meaningful careers in the helping professions or to numerous graduate specializations.

■ Professional Preparation

Students who major in human services prepare for jobs in both public and private agencies, exploring such areas as case work in social service and welfare agencies; therapeutic treatment programs in mental health settings; serving deaf clients through the use of American Sign Language; supportive counseling in community health centers; rehabilitation counseling; assisting individuals in sheltered workshops; parole counseling; court liaison work in programs for delinquent youth; staff work in halfway houses, penal institutions, and drug treatment centers; supportive counseling for the mentally retarded; community organizing; services for the aging; administration in human services agencies; and research and evaluation of social programs.

■ The Major

The Human Services Program offers an extensive advisory system to help students make the best use of course opportunities and to guide them in the choice of major specializations and in career planning.

■ Graduation Requirements

The overall requirements for each participating college differ in certain respects. Refer to pages 53–55 for college requirements in the College of Arts and Sciences, and to page 112 for college requirements in Boston-Bouvé College of Human Development Professions. Students in Boston-Bouvé College complete a five-year cooperative education program. The basic aspects of the program are as follows:

Prerequisite courses Prescribed courses in counseling, sociology, psychology, government, economics, and human services, for a total of six courses.

Core courses Nine courses in areas including counseling, statistics, research methods, group process, organizations, personality, intervention strategies, and a senior seminar.

Social and community issues Three courses from a list of recommended options in the areas of African-American studies, special education, poverty, or social problems.

Specializations A five-course specialization developed in conjunction with an adviser, in a subfield of human services of special interest to the student.

Typically, these specializations are in one of three areas: administrative, community, or clinical. Structured specializations have been developed in deaf studies, aging, administration, business, speech and hearing therapy, and other areas. Specific course choices are designed to complement the individual's interests and goals.

Fieldwork Two mandatory fieldwork placements during the last two years of their program. Students must apply for fieldwork assignments early in the quarter before the fieldwork will be done. Each placement consists of 150 hours on site. The type of placement varies according to the student's interest. In the past, students have found placements in community programs, nursing homes, vocational workshops, state and federal agencies, and recreational facilities—all under supervision by University staff.

Cooperative education job placements provide additional opportunities to put classroom knowledge and personal talents to work.

■ **Related Activities**

The Human Services Student Organization combines social and career-related activities, which in the past have included open houses, bake sales, clothing drives, meals for the homeless, social activities, day-long conferences, and weekend retreats.

Students and faculty publish the *Human Services Newsletter* quarterly. They also co-lead the Fenway Project, a campus office that recruits, places, and supports student volunteers in social, educational, and recreational agencies in Northeastern's immediate neighborhood. In recent years, project volunteers have worked with senior citizens, school-age children from a nearby housing project, patients and staff from a local health clinic, and many other groups. The year culminates in a community fair, the Fenfest, attended by students and permanent neighborhood residents. The Fenway Project began in 1973 through the auspices of Boston-Bouv  College and has been administered by the Human Services Program since 1986.

■ **Related Programs**

See American Sign Language Programs, Business Minor, Elementary Spanish Course for Criminal Justice and Human Services Majors, International Programs, Irish Studies Program, Linguistics Minor, and Women's Studies Minor in the Special Programs section, which begins on page 86.

Linguistics

Janet H. Randall, Ph.D., *Associate Professor and Coordinator*

Professors

Irene R. Fairley, Ph.D.,
English

Harlan Lane, Ph.D.,
Doc.  s Lettres,
Psychology

Joanne L. Miller, Ph.D.,
Psychology

Associate Professors

John N. Frampton, Ph.D.,
Mathematics

Michael R. Lipton, Ph.D.,
Philosophy and Religion

Holbrook C. Robinson, Ph.D.
Modern Languages

Assistant Professor

Nancy N. Soja, Ph.D.,
Psychology

Lynn Stephen
Anthropology

Instructor

Anthony P. Esposito, M.A.,
Modern Languages

Degrees Offered: Bachelor of Arts, Bachelor of Science

Linguistics is the science of language and focuses on such issues as how children learn to speak, how we understand and produce language, how language barriers keep people apart and language ties bring them together, how language is structured and represented in the mind, why some people are better at acquiring a second language than others, and how sign languages differ from spoken languages.

■ **Professional Preparation**

A major in linguistics may be a first step in becoming a linguist, an expert on child language, an interpreter, or an expert in the production and comprehension of language by computers. Specializing in linguistics allows students to gain insight into language itself—a fundamental component of the human cognitive system.

■ **The Major**

Linguistics is an interdepartmental major. Five departments (English, Modern Languages, Philosophy and Religion, Psychology, and Sociology/Anthropology) collaborate to offer a comprehensive program. The major reflects the current research of linguists, sociologists, psychologists, language educators, and teachers of second languages.

The major offers a systematic introduction to modern linguistics and is designed to meet the needs of students interested in:

- general linguistics (phonetics and phonology, semantics, syntax, bilingualism, historical linguistics, philosophy of language, language and culture, American Sign Language);
- experimental linguistics (language and cognition, child language, neurolinguistics, psycholinguistics);
- language-related work (language teaching, language testing, language teaching materials, interpreting, literary analysis).

Bachelor of arts and bachelor of science degree requirements are similar. The second language requirement can be met with American Sign Language for the B.S. degree but not for the B.A. degree.

Besides the general college requirements, the requirements of the major include six basic courses from the main areas of linguistics: general linguistics, psycholinguistics, sociolinguistics, and symbolic logic. Students also take five additional courses in an area of choice. These courses include, among others, Child Language, Philosophy of Language, Neurolinguistics, Syntax, Nonverbal Communication, Animal Communication, Introduction to Semantics, and Applied Linguistics. All students also take:

- an introductory laboratory course in language research;
- two advanced seminars in cognition, linguistics, psycholinguistics, or stylistics;
- a practicum in the form of fieldwork, interpreting, language teaching, directed study or other experience.

Students must demonstrate second-language proficiency through the level of Intermediate II plus two advanced courses. This requirement may be met either by taking courses or by the appropriate placement procedures.

Combined with other courses, the program is suitable for students interested in teaching American Sign Language. A concentration in the applied linguistics of sign language enables students to acquire the skills necessary to become professional teachers and helps them prepare for sign language instructor certification.

■ The Minor

The linguistics minor complements the study of any other language-related area. Specialized concentrations in linguistics include psycholinguistics, stylistics, language and culture, second-language teaching and applied linguistics, theoretical linguistics, and American Sign Language linguistics. Research opportunities exist through directed work-study.

■ Facilities

Students in a directed-study or laboratory course may use the Department of Psychology's language laboratories, which contain audio and video recording facilities and computers for stimulus preparation, data gathering, and statistical analysis. Undergraduates work with graduate students, research assistants, and faculty on projects related to the perception and production of spoken and sign languages.

■ Related Programs

See American Sign Language Programs and International Programs in the Special Programs section, which begins on page 86. See also The Minor in the English section, page 61; The Minor in the Psychology section, page 83; and the Computer Science section, page 128.

Special Note A brochure describing the linguistics major and minor and offering additional information can be obtained from any of the Linguistics faculty members.

Department of Political Science

| | | |
|-----------------------------|-----------------------------|-----------------------------|
| <i>Professors</i> | Minton F. Goldman, Ph.D. | Richard A. Loverd, Ph.D. |
| Robert L. Cord, Ph.D. | Eileen L. McDonagh, Ph.D. | William F. S. Miles, Ph.D. |
| Robert E. Gilbert, Ph.D. | David A. Rochefort, Ph.D. | Margaret A. Paternek, Ph.D. |
| Suzanne P. Ogden, Ph.D. | <i>Assistant Professors</i> | John H. Portz, Ph.D. |
| David E. Schmitt, Ph.D. | Leslie E. Armijo, Ph.D. | John F. L. Ross, Ph.D. |
| <i>Associate Professors</i> | David A. Dickson, Ph.D. | Denis J. Sullivan, Ph.D. |
| Christopher J. Bosso, Ph.D. | Duane L. Grimes, M.A. | Michael C. Tolley, Ph.D. |
| L. Gerald Bursey, Ph.D. | William D. Kay, Ph.D. | Bruce A. Wallin, Ph.D. |

Degrees Offered: Bachelor of Arts and Bachelor of Science in Political Science;
Bachelor of Science with a concentration in Public Administration;
Bachelor of Arts and Bachelor of Science with a concentration in Law and Legal Issues

Political science is the study of political institutions, the social and economic forces that shape them, the cultural contexts within which they operate, and human behavior in political matters.

The goals of the department are to help students:

- obtain a liberal arts education;
- develop an awareness of political forces in the environment;
- become more aware of their role as citizens in a democratic society;
- acquire a solid academic foundation for careers in political science, law, public administration, or other fields.

■ Professional Preparation

Studies in political science can help students prepare for government service; the study of law; the teaching of government and related subjects; careers in politics, public affairs, public management, journalism, international affairs, or international business.

For students who wish to pursue professional studies at the graduate level, concentration in political science, public administration, and/or law and legal issues may lead to many opportunities. The student's success will depend on such factors as academic record, experience, and personal initiative. Some career opportunities exist in public management at the federal, state, and local levels of government, while positions in research are available in government, university, and independent research bureaus. Law and teaching also offer career possibilities, as do specialized agencies in international bodies, such as the United Nations. Individuals with specialized training in political science can compete for positions in the public-service programming of educational and commercial television, in journalism, in legislative and lobbying work, in the public relations activities of private associations, and in profit and nonprofit corporations.

■ The Major

In addition to the college core curriculum requirements, the degree programs require several introductory political science courses, 24 to 28 quarter hours of electives in political science and six electives (24 quarter hours) in the social sciences. The social science electives must include one course each in three of the following: African-American studies, anthropology, economics, history, psychology, or sociology. The B.S. student is required to take eight quarter hours of research methods. Courses in basic math, FORTRAN, and FORGO are also recommended for B.S. students. The remaining three electives may be selected from any of the social science areas.

Law and Legal Issues Concentration A concentration in law and legal issues requires the completion of Introductory Political Science, American Government, Public Administration, and Political Theory as well as six electives relevant to law and legal issues, such as Constitutional Law, Civil Liberties, Law and Personal Morality, and International Law. Students in this concentration must take a limited number of additional political science courses as well as six electives in the social sciences. For students in the B.S. program, two research methods courses are required.

Public Administration Concentration The B.S. program with a concentration in public administration requires the completion of 40 hours of such courses as Introductory Political Science, American Government, Public Administration, Policy Analysis, Public Personnel Administration, Public Budgeting, Organizational Theory, and other courses relevant to the field. Students must also complete at least 16 quarter hours of public administration electives.

In addition, they must complete 24 quarter hours of electives in the social sciences, at least eight of which should be in economics. Interested students may undertake a directed-study project based on an internship experience in a government agency.

■ **The Minors**

A minor in political science entails successfully completing seven political science courses, at least two of which must be from among the following: Introduction to Politics, Introduction to American Government, Introduction to International Relations, Introduction to Foreign Governments, or Public Administration.

A minor in international politics requires successful completion of seven courses in international and/or comparative politics, including Introduction to International Relations and Introduction to Foreign Governments and Societies.

■ **Related Programs**

See International Programs, Russian Studies Minor, Teacher Preparation Option, and Women's Studies Minor in the Special Programs section, which begins on page 86. See also Center for Asian Studies, page 211.

Department of Psychology

Leon J. Kamin, Ph.D., *Professor and Chairman*

| | | |
|---|-------------------------------------|------------------------------------|
| <i>Professors</i> | | |
| Stephen G. Harkins, Ph.D. | Martin L. Block, Ph.D. | <i>Adjunct Associate Professor</i> |
| Harlan L. Lane, Ph.D., Doc. ès Lettres | Roger Brightbill, Ph.D. | Lawrence Stoddard, Ph.D. |
| Joanne Miller, Ph.D. | Perrin S. Cohen, Ph.D. | <i>Assistant Professors</i> |
| Bertram Scharf, Ph.D. | Judith A. Hall, Ph.D. | Jane A. Bybee, Ph.D. |
| Alexander A. Skavenski, Ph.D. | Charles Karis, Ph.D. | Rhea Eskew, Ph.D. |
| Harold S. Zamansky, Ph.D. | Harry Mackay, Ph.D. | Anne Kelley, Ph.D. |
| | Adam Reeves, Ph.D. | Julie K. Norem, Ph.D. |
| | James R. Stellar, Ph.D. | Nancy N. Soja, Ph.D. |
| <i>Associate Professors</i> | <i>Clinical Associate Professor</i> | Shari Speer, Ph.D. |
| Edward A. Arees, Ph.D. | Karen Gould, Ph.D. | |

Degrees Offered: Bachelor of Arts, Bachelor of Science

Psychology explores the behavior of animals and people, and the way people think. Psychology is an interdisciplinary science that includes methods and knowledge derived from the other natural and social sciences.

The psychology curriculum explores such topics as the function of the brain in determining behavior; how we see, hear, and learn; what is abnormal personality; how people develop emotionally and cognitively; and how individuals work in groups. The curriculum offers opportunities for laboratory practice and experimentation, individual research projects, and small-group seminars to encourage critical evaluation of psychology's accomplishments and its future.

■ Professional Preparation

The curriculum enables students to develop a solid scientific background in psychology and prepares students for careers in teaching, business, public service, and research. The curriculum also provides the basics for entrance to graduate programs in experimental, clinical, and educational psychology; law and medicine.

■ The Major

Degrees offered are the bachelor of arts (B.A.) and the bachelor of science (B.S.). The B.A. is intended for students who wish to pursue a broad liberal arts education that explores the humanities, social sciences, and, to a lesser extent, natural sciences. The B.S. degree is more specialized and is usually recommended for students who have a strong scientific interest in psychology and the natural sciences. A B.S. degree is recommended for students planning later graduate study in psychology, or for combining psychology with another interest, such as pre-medical training.

The B.A. and B.S. degrees differ in the pattern of required courses within the Psychology Department and the college core curriculum. The options are explained to all new students by their academic advisers at the beginning of their academic careers. The department encourages all students interested in psychology to call or visit the department for more information.

■ The Minor

Each student is required to take ten psychology courses, including the introductory psychology and statistics sequence, intermediate specialty courses, and at least one laboratory course. Students should meet with the undergraduate secretary in the department for more details.

■ Facilities

The department's resources for research include behavior laboratories for research with humans and animals; neuroanatomical, neuropharmacological, and histological laboratories; specialized enclosures and equipment for presenting visual and auditory stimuli and for measuring responses of the eye and the ear, including online computers; audio and video recording facilities and a computer for control of stimulus and response variables; and tachistoscopes, videotape equipment, and computerized subject rooms.

■ Related Programs

See American Sign Language Programs, Combined Program with Professional Schools, International Programs, Linguistics Minor, Teacher Preparation Option, and Women's Studies Minor in the Special Programs section, which begins on page 86.

Additional information regarding degree requirements, laboratory research opportunities, special academic programs, and career opportunities for psychology majors is available through the Department of Psychology at 125 Nightingale Hall, or by telephoning 617-437-4702.

Department of Sociology/Anthropology

Professors

Morris Freilich, Ph.D.
Debra R. Kaufman, Ph.D.
Elliott A. Krause, Ph.D.
Jack Levin, Ph.D.
Ronald J. McAllister, Ph.D.
Earl Rubington, Ph.D.

Associate Professors

Arnold Arluke, Ph.D.
Richard Bourne, Ph.D.

Winifred Breines, Ph.D.
Christine Gailey, Ph.D.
M. Patricia Golden, Ph.D.
Herman S. Gray, Ph.D.
Wilfred E. Holton, Ph.D.
Alan M. Klein, Ph.D.
Thomas H. Koenig, Ph.D.
Carol A. Owen, Ph.D.
Judith Perrolle, Ph.D.
Thomas M. Shapiro, Ph.D.

Assistant Professors

Michael Blim, Ph.D.
Daniel R. Faber, Ph.D.
Luis M. Falcon, Ph.D.
Anthony T. Jones, Ph.D.
Maureen Kelleher, Ph.D.
Gordana Rabrenovic, Ph.D.
Lynn Stephen, Ph.D.

Professor Emeritus

Morton Rubin, Ph.D.

Degrees Offered: Bachelor of Arts, Bachelor of Science

Sociology and anthropology apply a critical perspective to the study of the social arrangements in which human beings live and die. Systematic research methods and theory are brought to bear on how societies function and change and on how individuals, groups, and institutions interact. Social policy, social change, criminology, medical and mental health issues, and business issues are studied.

■ Professional Preparation

A major in sociology or anthropology offers background preparation and preprofessional training for careers in public or private service and research. Students may wish to pursue graduate study in sociology, anthropology, or social psychology. Sociology and anthropology provide a good base for those pursuing graduate professional training (law, social work, or public administration).

Sociology and anthropology courses can help provide a useful background for students in premedical, prelegal, paramedical, or other preprofessional programs. Cooperative education experiences vary from placement in mental hospitals and social agencies to placement in university, government, and other research and policy-making settings.

■ The Majors

Students may major in sociology or anthropology or both. Those who wish to study both must design their own programs, with the help of an adviser.

The requirements for sociology and anthropology degrees are listed here. Students with specific goals may take more departmental electives than are required. B.A. students may consider the requirements for B.S. students and consult their advisers for assistance in planning programs with specialized goals.

Students working toward a B.S. in anthropology or sociology must fulfill all the major requirements for the B.A. degree and must take additional course work as outlined below. Specializations are interdisciplinary and involve intensive study.

Anthropology B.A. students in anthropology must take at least 40 quarter hours in anthropology and 8 in sociology. The exact distribution can be arranged. Minimum requirements are as follows:

- Preparatory: Peoples and Cultures and Introduction to Sociology. (Students with equivalent background who intend to major in anthropology may be exempted. Students should consult a departmental adviser.)
- Core requirements: At least three from among Language and Culture; Individual and Culture; Human Origins; Myth and Religion; Sex, Sex Roles, and Family; and Archaeology.

- **Electives:** At least six electives in anthropology and at least one elective in sociology. Qualified students are encouraged to take relevant graduate courses with the consent of the instructor. Students majoring in anthropology should consult their advisers since courses elsewhere in the University may round out a special interest.
- **Nondepartmental requirements:** Six courses from among African-American studies, economics, history, political science, and psychology.

B.S. students in anthropology take the same basic core of courses and select a specialization consisting of at least five courses. Students must confer with an adviser who will help develop such a program, place it on record, and supervise it. Interdepartmental and interdisciplinary specializations can be arranged in such areas as linguistics, Native American studies, biological anthropology, psychological anthropology, or area studies focusing on Latin America, Africa, Asia, or the Middle East.

Sociology B.A. students in sociology must take at least 44 quarter hours in sociology and 8 in anthropology, and must meet the following minimum requirements:

- **Preparatory:** Peoples and Cultures and Introduction to Sociology. (Students with equivalent background who intend to major in sociology may be exempted. Students must check with a departmental adviser.)
- **Core requirements:** Statistical Analysis; Research Methods I; Research Methods II; Classical Social Thought; Current Social Thought; Class, Power, and Social Change.
- **Minimum elective requirements:** two intermediate courses (excluding Introduction to Sociology); two advanced courses; and one intermediate or advanced anthropology course. With the adviser's consent, qualified students are encouraged to take graduate and directed-study courses and/or the Senior Majors Seminar.
- **Nondepartmental requirements:** six courses from the following social sciences: African-American studies, economics, history, political science, and psychology.

B.S. degree students in sociology take the same basic core of courses as B.A. students and select a specialization consisting of at least six courses. Students must confer with an adviser who will help develop such a program, place it on record, and supervise it. Specializations can be arranged focusing on social welfare, health services, political studies, urban studies, education and society, ethnic studies, and organizational studies.

■ The Minors

Anthropology The minor program consists of the following:

- Peoples and Cultures;
- Language and Culture, Individual and Culture, and Sex, Sex Roles, and Family;
- any two-course specialization in anthropology arranged between the student and the adviser.

Sociology The minor program consists of the following:

- Introduction to Sociology;
- two courses from among Research Methods I, Research Methods II, Classical Social Thought, Current Social Thought;
- any three-course specialization in sociology arranged between the student and the adviser;
- one additional sociology course.

It is sometimes possible to substitute a course from another department for one of the requirements.

■ Related Programs

See International Programs, Russian Studies Minor, School for Field Studies, Teacher Preparation Option, and Women's Studies Minor in the Special Programs section below.

Special Programs in the College of Arts and Sciences

The College of Arts and Sciences offers a wide variety of special programs. Field-study programs, international work-study opportunities, interdisciplinary majors and minors, and involvement with professionals are available to students who meet the program eligibility requirements. Detailed information about these programs is available from involved departments and the Office of the Dean.

Availability of all special programs is contingent on minimum enrollment requirements and, when an outside institution is involved, continued affiliation of that institution with the University.

■ International Programs

Study Abroad A series of overseas study programs is under development. Qualified middlers, juniors, and seniors with a cumulative quality-point average of 3.0 or higher are eligible. These are the current offerings:

Ireland: North and South Through collaborative arrangements with the Institute of Public Administration in Dublin, Ireland, and the Queen's University of Belfast, Northern Ireland, qualified Northeastern University students attend classes during the fall quarter in Dublin, where they also intern with members of the lower house of the Irish parliament (the Dail). At the completion of the quarter, students move to Northern Ireland, where they attend winter-term classes at the Queen's University of Belfast. A total of 32 credits may be earned for successful completion of this program.

Northeastern University—Moscow State University Exchange This six-month program will begin in January 1991 with an exchange of ten students. The first month will be devoted to an intensive language course (prior study of Russian required). Students will take courses in journalism and participate in an internship in a Soviet media organization. Students earn 32 credits upon successful completion of the program.

Year at Oxford Special academic counseling is made available to qualified students who wish to apply to spend a year at St. Hugh's College, St. Hilda's College, or St. Edmund Hall. There is a wide variety of fields of study, including many of the majors in the college.

Business German Students may use this course as a prerequisite to conversational German courses in preparation for a business-oriented co-op in Germany (see International Cooperative Education, page 28).

This course, taught in English, is designed for students of business and economics seeking competence in the reading and understanding of texts produced by the German business community and trade media. Course goals are to help students:

- develop a working knowledge of the grammar and terminology used in business writings;
- develop effective comprehension procedures for efficient reading;
- understand Germany, its industrial geography, trade relations with the United States, and role in international commerce.

Readings from English-language trade publications ensure a steady influx of outside information and serve as the basis for weekly summary assignments designed to upgrade students' writing skills.

Additional information may be obtained from Professor Ross Hall in the Department of Modern Languages, 360 Holmes Hall, 617-437-2234.

Asian Studies The director of the Center for Asian Studies coordinates the Asian Studies Minor, which draws together studies in the Departments of Art, History, Modern Languages, Philosophy and Religion, Political Science, and Sociology/Anthropology. Among courses offered are history, language, philosophy and religion, political science, sociology, and anthropology. For more information, see page 211.

East/West Marine Biology Program The East/West Marine Biology Program allows advanced undergraduate and beginning graduate students in biology and related areas to spend a year of field study in three diverse marine environments.

The program begins in the fall in Friday Harbor, Washington, on San Juan Island. The Pacific Northwest coast is noted for its giant kelp, diverse marine invertebrates, fish, birds, and marine mammals. While living at the University of Washington's Friday Harbor Laboratories, students study invertebrate zoology, marine birds and mammals, marine ecology, and ocean and coastal processes—subjects that offer a foundation for the tropical and East Coast marine biology courses that follow. Credit is given for independent research projects in any or all of the three quarters.

In January, students travel to Jamaica to study tropical biology at the Discovery Bay Marine Laboratory on the island's north coast. The laboratory is located on the shore, within walking and swimming distances of rich coral reefs and sandy bays interspersed with beds of turtle grass. Course work focuses on the tropical environment while building on the comparative aspects of field biology. Field trips to the montane forests, lectures on the island's terrestrial ecology, and the experience of Jamaican culture are important parts of the program.

Students travel to Northeastern University for the final phase of the program. They live in private housing near the Marine Science Center at East Point, Nahant, north of Boston. The laboratory is located on 20 acres of open land at the end of a rocky point extending into the Atlantic Ocean. During spring quarter, courses focus on the marine plants and animals of New England while emphasizing advanced and comparative aspects of marine biology, benthic ecology, and the behavior of marine animals.

French for Business and Economics Students Designed for students interested in international business, the program offers a thorough study of grammar, insights into the French way of life, specialized vocabulary related to the business world, and an introduction to French business texts. The course is a preliminary step for the student wishing co-op placement in France. Additional information may be obtained from Juliette Gilman, 362 Holmes Hall, 617-437-3659.

International Cooperative Education Extending its Cooperative Plan of Education to the international scene, Northeastern offers qualified upperclass students the opportunity for placement abroad. This program operates in cooperation with overseas institutions and sponsoring agencies. Students whose academic, linguistic, and professional experience qualifies them for overseas positions may work in Great Britain, The Netherlands, Sweden, Ireland, Canada, and the French- and German-speaking countries of Europe. The program helps to meet a need for professionals with the international expertise and language proficiency to help companies expand overseas markets. Detailed information about the program may be obtained from the Department of Modern Languages, 360 Holmes Hall, or the Office of International Cooperative Education, 502 Stearns Center.

Irish Studies Program This program promotes cultural programs on Ireland and Irish America, and cooperative exchanges of Irish and American students for work and study. The Distinguished Speakers Series enables University faculty and staff to develop mutually beneficial relationships with Irish counterparts in all disciplines.

The program includes a research project that is a database on characteristics of Irish immigrants in North America. When completed, the project will provide a rich source of data on the origins, arrival, and migration patterns of the Irish in America. Data are drawn from a missing persons column that ran in the *Boston Pilot* from 1831 through 1916. Volume One, which consists of 4,788 entries (1831—1850), was published by the New England Historic Genealogical Society in 1987. The second volume is scheduled to be published in January 1991.

Through International Co-op, students are placed in various businesses and agencies in the Republic of Ireland and in Northern Ireland. The Working Papers in Irish Studies Series provides an opportunity to disseminate manuscripts of current interest. Cultural efforts include a film series, development of a library collection, and art exhibitions, as well as student activities in the Irish Student Club. Plans to develop an interdisciplinary minor are under way. Dr. Ruth-Ann Harris, Department of History, is the director of the Irish Studies Program. For more information, telephone Dr. Harris at 617-437-2907.

School for Field Studies The College of Arts and Sciences is affiliated with the School for Field Studies (SFS), a nonprofit educational organization that offers semester-long one-month field study expeditions throughout the world. Offered yearly are semester programs on wildlife management in Athi Plains, Kenya; on coral reef ecology in St. John, U.S. Virgin Islands; and on the rain forest biogeography of North Queensland, Australia; and others. Programs combine applied academics with training in field research methods and teamwork—an exciting hands-on approach to science. Credit is granted for the course work. Students of all levels and disciplines are eligible, but participation of Northeastern University students is limited proportionate to the total number of outside participants in the SFS program. Additional information may be obtained from the Office of the Dean of the College of Arts and Sciences.

■ Interdisciplinary Minors

The College of Arts and Sciences offers upperclass students several choices of minor. Minors offered through single departments are explained in the description of the relevant department. Descriptions of interdisciplinary programs follow.

Asian Studies The Asian Studies Minor draws together studies in the Departments of Art, History, Modern Languages, Philosophy and Religion, Political Science, and Sociology/Anthropology. Among courses offered are history, language, philosophy and religion, political science, sociology, and anthropology.

Business The College of Business Administration (CBA), in collaboration with the College of Arts and Sciences, offers a business minor for students outside CBA. This minor may be valuable to students seeking jobs in the public or private sector.

Courses in the minor cover substantially the areas required by the American Assembly of Collegiate Schools of Business as part of the relevant “common body of knowledge.” With the exception of accounting, the business courses included are the same as those taken by all students in the College of Business Administration.

For details, including full requirements and program admission standards, contact the Office of Undergraduate Programs of the College of Business Administration.

Cinema Studies The cinema studies minor may serve as an introduction to film for students interested in graduate study in film scholarship and/or filmmaking. Cinema studies enables students to develop analytical skills and critical tools to study relationships between film and society, history, aesthetics, philosophy, and psychoanalysis. Cinema studies courses are selected from the Departments of Art and Architecture, English, History, Modern Languages, Music, Sociology/Anthropology, and Speech Communication. In addition to satisfying requirements in film analysis, film theory, and filmmaking, students pursuing a minor choose courses from departmental offerings.

Linguistics Five departments—English, Modern Languages, Philosophy and Religion, Sociology/Anthropology, and Psychology—offer the linguistics minor, which reflects current research of such specialists as linguists, sociologists, psychologists, language educators, speech pathologists, neurologists, and teachers of second languages. The linguistics minor complements the study of any other language-related area, such as computer science, anthropology, brain physiology, or language teaching. Specialized concentrations within linguistics include psycholinguistics, stylistics, language and culture, second-language teaching and applied linguistics, theoretical linguistics, and American Sign Language linguistics. Many research opportunities exist through directed work-study.

Marine Studies The marine studies minor provides a program in the multidisciplinary aspects of the marine environment. The program identifies and uses marine-related courses and programs throughout the University and the New England area. Students from any major who have an interest in the marine environment may participate. Students from such areas as journalism and engineering have completed the minor, as have students in the sciences. The program allows an emphasis in either the scientific or social science/humanistic study of the oceans. Some physical interaction with the sea through achievement in a marine-related skill and an independent project are required of all participants. Dr. Peter Rosen, Department of Geology, is coordinator of the marine studies minor. For more information, telephone 617-437-4380.

Media Studies Media studies courses are selected from the departments of Political Science, Music, Speech Communication, Art and Architecture, Theatre and Dance, History and English, and the School of Journalism. Each student satisfies requirements in the background and theory of mass media, then completes courses in media production and media application.

Russian Studies The Russian studies minor is an interdisciplinary program that provides students with an opportunity to develop a broad understanding of the Soviet Union and Eastern Europe. Through the study of language, literature, society, history, economy, culture, and behavior, students can learn about the people of this enormous region. The minor may help prepare students for graduate study or employment in such areas as government, teaching, journalism, and business.

Technical Communication Technical communication combines written, oral, and graphics skills with a background in science or technology. The minor in technical communication helps students prepare to be technical writers or to enter careers in which technical communication is a significant part of their jobs. Students in English or other liberal arts studies may elect the minor, as may students from technological or scientific fields.

Women's Studies The Women's Studies Program enables students to approach various disciplines from the perspective of women. It is an interdisciplinary program that incorporates scholarship on women's and men's roles in society and examines the importance of gender in past and present societies. Students examine traditional stereotypes and changing roles; learn about women in history, culture, and politics; and consider the changing situation of men and women today. The Women's Studies Program coordinates the Boston Area Colloquium on Feminist Theory, organizes an in-house lecture series, produces the Working Papers in Women's Studies Series, and maintains liaisons with the student-run Women's Center at Northeastern. For more information, contact Dr. Laura L. Frader, Department of History, 617-437-4442.

■ American Sign Language Programs

The Sign Language Program, affiliated with the Department of Modern Languages, offers day and evening courses in American Sign Language (ASL) conversation and interpretation. Courses in the structure of ASL, deaf culture, deaf history, ASL literature and ASL linguistics, and sign language teaching are also offered. Conversation courses are designed to include features typically found in second-language curricula: vocabulary, grammatical structure, and the culture of the target language group. Each course provides an opportunity for students to interact directly with deaf people, observe ASL in use, and practice signing skills. The program uses instructional media for individualized practice on receptive skills and vocabulary review.

Related Degree Programs American Sign Language courses are an integral part of the B.A. in human services with a specialization in deaf studies and the B.A. and B.S. degrees in linguistics. The deaf studies specialization within the Human Services Program addresses an increasing need for human services professionals with knowledge of the deaf community and skills in American Sign Language. Students interested in working with deaf people may consider a B.A. degree in this area. See also the Human Services section on page 77.

The linguistics major is a comprehensive introduction to the study of language reflecting the research of linguists, sociologists, psychologists, language educators, and teachers of second languages. The major offers the special opportunity to work toward a B.S. degree focusing on American Sign Language or applied areas of ASL linguistics. See also the Linguistics section, page 79.

Interpreter Education Project Northeastern University is one of ten recipients of a five-year grant from the U.S. Department of Education, Rehabilitation Services Administration, for the purpose of developing and coordinating interpreter training activities to serve Connecticut, Massachusetts, New Jersey, and New York, and to develop on-campus programs at Northeastern University. The project's goals are to design and propose a five-year bachelor's degree in sign language interpreting, coordinate and provide short-term interpreter training opportunities, and design and pilot a six-month interpreter apprenticeship for newly trained interpreters.

Sign Language Teacher Training Program As the New England regional training program under the National Association of the Deaf National Consortium of Programs for the Training of Sign Language Instructors, Northeastern University offers programs to train teachers of ASL. The Summer Program for the Training of Sign Language Instructors offers an intensive introduction to the professional teaching of ASL as a second language. It is designed for current and prospective teachers already fluent in ASL.

Visiting Students Program Programs are available for students who wish to visit the University and become involved in an intensive exposure to ASL linguistics. These students can take courses in linguistics and ASL, as well as participate in directed studies and ongoing ASL research projects in the Language and Cognition Laboratory of the Department of Psychology.

■ Additional Programs

The remainder of the special programs offered by the College of Arts and Sciences are described in alphabetical order below.

Combined Program with Professional Schools Under this program, a preprofessional student may reduce by one year the time normally required for obtaining both the undergraduate and professional degrees. Students who have completed at least three-fourths of the work required for a baccalaureate degree in the College of Arts and Sciences and who are accepted into an approved professional school of dentistry, law, medicine, optometry, osteopathy, or veterinary medicine will be eligible for the B.A. or B.S. degree at the end of their second year in a professional school. At least two-thirds of the work for the baccalaureate degree must be earned in residence at Northeastern, and all other College of Arts and Sciences requirements must be fulfilled, the residence requirement having been completed prior to entrance into the professional school.

Elementary Spanish for Criminal Justice or Human Services Majors This course is intended for students who will need to use Spanish in police work and in social service settings. The grammar taught is the same as that in other elementary Spanish courses. The vocabulary is adapted to particular needs and interests of the students. Role-playing is used extensively, and students practice “intake” interviews in the course.

Marine Science Center Summer Program in Marine Biology The summer program allows students to participate in intensive courses at the Marine Science Center. Summer course offerings include Introduction to Marine Biology, Focus on the Sea: Issues and Nature, Marine Birds and Mammals, Biology of Fishes, Larval Ecology of Marine Invertebrates, Diving Research Methods, Developmental Biology of Marine Invertebrates, and Biomechanics. Its access to sites where marine organisms are easily collected makes the MSC laboratory an attractive location for both introductory and advanced courses. Field biology and the use of living marine organisms are emphasized in laboratory-based courses.

Students conduct independent research at the MSC laboratory throughout the year. Resident and visiting faculty supervise a variety of research topics. Graduate students from other universities are encouraged to use the laboratory and field sites for thesis research. For more information about the Marine Science Center, see page 212.

Massachusetts Bay Marine Studies Consortium Northeastern University is a member of the Massachusetts Bay Marine Studies Consortium. The consortium's offerings are interdisciplinary and seek to bridge academic disciplines and current concerns in the marine world. The consortium serves the students and faculty of 22 Boston-area colleges and universities. While students may register at Northeastern for these courses, students from all Greater Boston colleges may take these classes, which are taught by specialists and government officials.

Four courses are offered. A Maritime History of New England surveys that area's marine legacy from the earliest Indian fisheries to shipbuilding to modern commerce. Into the Ocean World: Marine Studies Seminar takes an interdisciplinary approach to marine systems, starting with Boston Harbor as a case study. Water:

Planning for the Future focuses on local and global water issues. Marine Mammals: Biology and Conservation is taught at Boston's New England Aquarium. For more information, contact Dr. Peter S. Rosen, the Department of Geology, at 617-437-4380.

New England Conservatory Affiliation A limited number of qualified Arts and Sciences students may take courses at the New England Conservatory as part of the regular course load and tuition fee at Northeastern. This arrangement enables Northeastern students who qualify to enhance their cultural life with the richness of music education that is the hallmark of the Conservatory. Northeastern students who participate in this program, as well as any student majoring in music, are also given full library privileges to the Conservatory.

Students interested in this program should contact Professor Joshua Jacobson, Chairman of the Department of Music, at 617-437-2440.

■ Performing and Visual Arts

Established in 1981 in order to expand the role of the arts at Northeastern University, the Division of Performing and Visual Arts includes three undergraduate academic departments—Art and Architecture, Music, and Theatre and Dance—and the non-academic African-American Master Artists-in-Residency Program (see below). Under its *nuArts* banner, the division produces professional visual and performing arts programs in a variety of media, among them the annual *nuArts* Performance Series.

The division also manages the University's performing arts facilities, which include the Blackman Auditorium Theatre Complex, and operates the *nuArts* Ticket and Information Center. Tickets to and information about performing and visual arts events and other campus events are available here, as are tickets and passes to local dance, music, theatre, film, and visual arts events. It also provides free passes to the Museum of Fine Arts and other area museums. The division maintains a University membership at the neighboring Museum of Fine Arts entitling all undergraduate students in the Basic Colleges to free membership privileges.

The Division of Performing and Visual Arts produces a range of programs in film, music, dance, visual arts, theatre, and multimedia performance. Augmenting these programs are performances by the division's artists-in-residence companies, which currently include the Boston Lyric Opera Company, the Boston Chapter of the League of Composers—International Society for Contemporary Music, and the New England Composers Orchestra (see page 93). The division reaches national and international audiences through a weekly musical radio program, "A Note to You," produced in association with WGBH-FM radio, Boston, for broadcast distribution by the National Public Radio network.

To promote the arts on campus, the division publishes season brochures, event announcements, and various other informational materials.

For information about the academic programs within the Division of Performing and Visual Arts, see pages 56–59.

African-American Master Artists-in-Residency Program The African-American Master Artists-in-Residency Program (AAMARP) is a multicultural professional department within the Division of Performing and Visual Arts. The only program of its kind in the country, AAMARP provides the best aesthetic presentations from a wide spectrum of artists. Although its artistic residencies, which provide studio space and exhibitions for individual artists, are limited to persons of color, its galleries and community spaces are open to all. Since 1978, the AAMARP facilities have housed dozens of African, Asian, Hispanic, European, and Native American exhibitions, performances, and special programs from artists in the Boston area and throughout the nation.

Boston Lyric Opera Company The Boston Lyric Opera Company (BLO), an artists-in-residence program within Northeastern University's Division of Performing and Visual Arts, is a professional opera company that provides performance opportunities for New England singers, directors, and designers. The company performs an annual season of fully staged opera productions at the University's Blackman Auditorium.

League of Composers—International Society for Contemporary Music The Boston Chapter of the League of Composers—International Society for Contemporary Music (League—ISCM) is an artists-in-residence program within the Department of Music and is one of the oldest and most prestigious international organizations dedicated to the promulgation of new music. With chapters in more than 40 countries and a membership that has included Schönberg, Stravinsky, Bartók, and Ravel, the League—ISCM has introduced the public to works of some of the most important twentieth-century composers. Under the direction of Professor Dennis Miller, the league's activities include an annual concert series; co-sponsorship with the Department of Music of the annual Leo Snyder Memorial Award in Composition and Concert; production of *New Music—Boston*; a calendar listing of Boston's new music activities; and publication of *Essays on Modern Music*, an annual monograph featuring articles on contemporary music written by composers, new music scholars, and critics.

New England Composers Orchestra The New England Composers Orchestra (NECO) is an artists-in-residence program affiliated with the Department of Music and the Division of Performing and Visual Arts. The Boston-based organization is composed of 60 professional musicians formed for the purpose of studying new works by New England composers. The works are chosen through competition each year and then rehearsed, taped, and discussed in a series of open rehearsals, known as "readings," which are held at Northeastern and are open to the public.

■ Teacher Preparation Option

On October 1, 1994, a two-stage teacher certification process will go into effect in Massachusetts. Students planning to teach in secondary school can complete the requirements for application to the first stage, Provisional Certification, while they are undergraduates. Such students should major in an Arts and Sciences area and take a specific minor in Education that includes course work and practice teaching. Advisers in the College of Arts and Sciences are available to assist students in working out their programs.

■ Journals

Essays on Modern Music An annual monograph series of the League of Composers—International Society for Contemporary Music, *Essays on Modern Music* is published through the University's Division of Performing and Visual Arts. The monographs feature articles on topics in contemporary music. Essays are written by composers, new music scholars, and critics. Articles cover specific composers, historical eras, and other topics of interest to the general reader, music students, and scholars.

New England Quarterly Published since 1928, the *New England Quarterly* is America's leading historical review of New England life and letters. Each issue presents major articles in the fields of literature, history, and culture; a special feature of brief memoranda and recently discovered documents; and a book review section.

Nineteenth-Century Contexts The journal of the Interdisciplinary Nineteenth-Century Studies (INCS), *Nineteenth-Century Contexts*, publishes articles emphasizing an interdisciplinary approach to topics and issues in nineteenth-century studies. It also presents reviews and a forum on subjects of interest to scholars. Formerly *Romanticism Past and Present*, the journal, edited by Professor Stuart Peterfreund of the English Department, has broadened its scope to encompass the full century and to include disciplines such as philosophy, history, art history, and musicology.

The Scriblerian Founded in 1969, *Scriblerian* is published in the autumn and spring by Northeastern's and Temple University's English departments. A semiannual news journal devoted to research on the Augustan Age of English literature (1660–1750), it prints reviews and articles on such figures as Dryden, Pope, Swift, Defoe, Fielding, Richardson, Smollett, and Sterne. Its Northeastern editor is Dr. Arthur J. Weitzman. The journal is affiliated with and financially supported by Queen's University (Kingston, Ontario), the University of Florida (Gainesville), and the University of Tennessee (Knoxville).

Studies in American Fiction A publication that presents articles, notes, and reviews on all aspects of American prose fiction, *Studies in American Fiction* has a readership and contributors who represent an international community of literary scholars. The journal's purpose is to publish discoveries in, documents on, and new interpretations of important works of American fiction. The publication of Volume 16 in 1989 marked seventeen years of Northeastern's sponsorship of *Studies in American Fiction*, the first scholarly journal to be published by the University.

School of Journalism



LaRue W. Gilleland, M.A., *Professor and Director*

Associate Professors

Patricia A. Kelly, Ph.D.

William Kirtz, M.S.

Assistant Professors

Jerome M. Berger, M.S.

Nicholas Daniloff, M.A.

Charles F. Fountain, M.S.

Nancy Gallinger, M.A.

Andrew P. Jones, M.S.

James Ross, M.A.

William Smith, J.D.

Degrees Offered: Bachelor of Arts, Bachelor of Science

The School of Journalism, a unit of the College of Arts and Sciences, prepares students for careers in news media and related fields. However, the skills it emphasizes in writing, editing, information gathering, photojournalism, and design and graphics have broad applications in numerous other disciplines.

The school also seeks to contribute to the existing body of knowledge in journalism and mass communications in areas that will help news media practitioners and educators perform their jobs with increasing effectiveness. By cooperating with media and related agencies, the school sponsors professional workshops and seminars that students are invited to attend.

■ Professional Preparation

Journalism provides many exciting, rewarding career opportunities. Northeastern journalism graduates work for some of the world's best newspapers, news departments of radio and television stations, wire services, general and specialized magazines, public relations departments, and advertising agencies.

Because journalism skills can be better expanded and understood with the aid of a laboratory, upperclass students who major in journalism are encouraged to participate in the Cooperative Plan of Education. Co-op assignments with newspapers, radio and television stations, news bureaus, advertising agencies, and public relations offices provide practical laboratory experience important in helping students prepare for careers in mass communications. Such experience also offers an advantage to those who decide to seek admission to a graduate program.

■ The Program

The school offers four undergraduate concentrations:

- advertising;
- newspaper/print media;
- public relations;
- radio/television news.

Students have the option of enrolling in either a Five-Year Cooperative Education Program or a four-year program without co-op. Cooperative education experience, however, is strongly advised.

The school offers the bachelor of arts and bachelor of science degrees. Candidates for either degree must satisfy three groups of requirements: those for their concentration, those for the common core of professional courses (Newswriting, Law of the Press, History of Journalism, Photojournalism, and Journalism Ethics), and those for the College of Arts and Sciences core curriculum. (See page 54.) In addition, the bachelor of arts also has a foreign language requirement.

A journalist should have a broad background of liberal arts courses. At Northeastern, the formula for a bachelor's degree in journalism is a combination of 75 percent arts and sciences courses and 25 percent professional courses. The ideal schedule is one or two journalism courses each quarter, with additional work in the humanities, social sciences, physical sciences, and economics.

■ Honors Program See page 18.

■ Graduation Requirements See page 53.

■ Graduation with Honors See page 49.

■ Facilities

The school's facilities include a design and graphics lab, a photojournalism darkroom, and newswriting and editing labs containing computer equipment found in many major publishing companies. The school also shares a television/media studio with a number of other academic departments.

■ Affiliations

The New England Press Association (NEPA), representing 350 newspaper publishers, maintains its office on the Northeastern campus. Students have the opportunity to attend seminars and conferences sponsored by NEPA and other organizations.

■ Graduate Education For information on graduate degrees in journalism, see page 205.

Boston-Bouvé College of Human Development Professions



Paul M. Lepley, Ed.D., *Dean*

Arlene T. Greenstein, Ph.D., *Associate Dean for Academic Affairs*

Janice Walker, A.B., *Assistant Dean and Director of the Graduate School*

Michael E. Gladstone, M.A., *Assistant Dean*

Cornelius B. O'Leary, B.A., *Director of Graduate Admissions*

Boston-Bouvé College of Human Development Professions offers students the high quality instruction, guidance, and practical experience essential to accomplished practitioners in the human development professions. Typically, these students share a commitment to improve the quality of life whether they are in community, recreational, clinical, or educational settings. Undergraduate programs are offered in the Human Services Program and in three departments: Education; Health, Sport, and Leisure Studies; and Physical Therapy.

Boston-Bouvé College offers students the advantages of a small college—individual attention and encouragement—within the framework of a large university.

■ **Five-Year Cooperative Education Program**

Freshmen receive a solid grounding in the liberal arts and sciences, and are oriented to their chosen profession. Sophomores are introduced to specific competencies that are developed and expanded throughout the program. In the middler, junior, and senior years, professional theory and practices are emphasized. All students have the opportunity to synthesize knowledge and skills through supervised experiences in clinical practice, student teaching, field experience, or internship.

Cooperative education is an integral part of all programs offered in the college. Beginning in the sophomore year, each curriculum is enriched by cooperative education work experiences for two of the four quarters in an academic year. Co-op jobs afford students the opportunity to develop work skills related to the helping professions, usually within an area of specialization.

■ **Honors Program**

The Boston-Bouvé College of Human Development Professions participates in the University Honors Program. See pages 18–19.

■ **Graduation Requirements**

Degrees Students in the programs for early childhood education, elementary education, athletic training, cardiovascular health and exercise, human services, community health education, physical education teacher preparation, and school health education earn a Bachelor of Science in Education. Students in the recreation management and therapeutic recreation program specializations are awarded the Bachelor of Science in Recreation and Leisure Studies. Students graduating in physical therapy receive the degree of Bachelor of Science in Physical Therapy. These degrees are awarded to qualified candidates who have completed the prescribed curricula. Student teaching, field experience, or clinical practice is an integral part of each student's curriculum, and satisfactory completion is required for graduation. All majors require demonstration of computer literacy and satisfactory completion of the Middler-Year Writing Requirement, in addition to the other University and college requirements, prior to graduation.

Quantitative The quarter hours required in each curriculum vary.

Education

Early Childhood Education 177–185[†]
Elementary Education 176–185[†]

Health, Sport, and Leisure Studies

Athletic Training 181*
Cardiovascular Health and Exercise 178
Community Health Education 180
Physical Education Teacher
Preparation 180*
Recreation Management 173
School Health Education 180*

Human Services

Human Services 176

Physical Therapy

Physical Therapy 185

*Subject to change pending curriculum revisions.

[†]Pending approval.

Students must satisfy the requirements of the Department of Cooperative Education to become eligible for their degrees. Senior-year course work and required experiences must be completed in full-time residence at Northeastern or in an educational setting approved by the college.

Qualitative The overall cumulative quality-point averages required to enter each class level are stated in the *Student Handbook*. Throughout the professional sequence, students must maintain required averages and must demonstrate a high level of personal and professional maturity to continue field practice and be approved for graduation. Because of accreditation recommendations and differences in curricula, variations in qualitative requirements may occur.

Transfer students in any curriculum may be accepted into the college at upper-class levels if there are available spaces. However, transfer into the physical therapy program is limited to only the freshman and sophomore years. Each transcript is individually assessed for qualification, placement, and program design. For more information on transferring, see Admission of Transfer Students, page 22.

- **Graduation with Honors** See page 49.

■ Facilities

The facilities of the college include classrooms, faculty and administrative offices, and areas for research, professional endeavors, and extracurricular activities. The remodeled and expanded facilities of the Department of Physical Therapy are located in Mary Gass Robinson Hall. Dockser Hall houses a gymnasium, a dance studio, computer rooms, an exercise physiology laboratory, locker and shower facilities, and a kinesiology laboratory. The swimming pool, weight room, handball/racquetball courts, and locker and shower facilities are located in Barletta Natatorium. Cabot Physical Education Center houses a large gymnasium, an indoor running track, tennis courts, fitness rooms, instruction in weight training and the martial arts, and the Kerkor “Koko” Kassabian Athletic Training Laboratory.

The Department of Education oversees the Reading Clinic, which provides corrective instruction for area schoolchildren and clinical experience for education students. Similarly, the Russell J. Call Children’s Center provides day care for children from two years and nine months to five years of age and a laboratory setting for students seeking teacher certification. Children’s literature and related learning resource materials are housed in the F. André Favat Center and Library of Children’s Literature (see page 215).

The Lupean Professional Library maintains an up-to-date collection of physical therapy and medical textbooks and periodicals that supplement the University library. The Human Gross Anatomy Laboratory, five classroom laboratories, and two research laboratories are designed and equipped specifically for the practice of clinical procedures and research.

The Hearing, Language, and Speech Center serves clients ranging from toddlers to the elderly. Diagnostic evaluations and treatment are provided to clients who demonstrate a variety of communication disorders. Students may also engage in academic research in communication disorders. The Communications Research Laboratory makes available an array of up-to-date equipment and computer technology to aid students in generating, analyzing, and compiling the results of their work.

The Warren Center serves as a practical laboratory and as a recreation center for the college. Its athletic fields, tennis courts, ropes course, cross-country ski trails, winterized cottages, and Hayden Lodge provide year-round opportunities for outdoor learning 25 miles from the Boston campus. Freshman orientation, courses, seminars, and workshops are conducted at the center throughout the year.

■ **Fieldwork, Student Teaching, Clinical Practicums, and Internship Prerequisites**

Each major area of study requires satisfactory completion of specified prerequisites before assignment to fieldwork, student teaching, clinical practicum, or internship. For certain programs students must be covered by professional liability insurance (purchased for a moderate fee through the University). In the fourth year, before the first supervised clinical education experience, physical therapy students must be examined by physicians in the University Health Services (again, at a moderate fee) or by a personal physician. Students in programs offered by the Department of Education and the Department of Health, Sport, and Leisure Studies must present evidence that they are free of tuberculosis before engaging in student teaching. For more details on medical requirements, see page 24.

■ **Licensure/Registration**

All 50 states have laws governing the practice of physical therapy. To be eligible to practice physical therapy, graduates must meet the specific legal requirements of the state in which they wish to practice. In most states the requirements include graduation from an accredited school of physical therapy and a satisfactory grade on a licensure examination. Graduates are responsible for determining what the specific legal requirements are in the state in which they seek employment.

■ **Certification**

Upon successful completion of the programs in early childhood education, elementary education, school health education, and physical education, students are eligible to apply for certification by the Commonwealth of Massachusetts. Certification is required for public school teaching, but achieving it does not guarantee a position. Reciprocal certification is available in many states. Graduates are responsible for determining the requirements of the states in which they are interested.

■ **Graduate Education** For information on graduate degrees, see page 205.

Department of Education

Maurice Kaufman, Ph.D., *Professor and Chairman*

Professors

John D. Herzog, Ph.D.
Mervin D. Lynch, Ph.D.
Sandra M. Parker, Ed.D.

Associate Professors

Nicholas J. Buffone, Ph.D.
Leslie A. Burg, Ed.D.
Mary J. Lee, M.Ed.
Joseph Meier, Ed.D.
Irene A. Nichols, Ed.D.

Barbara A. Schram, Ed.D.

Assistant Professors

Thomas H. Clark, M.A.
Carlton B. Lehmkuhl, Ph.D.

Degree Offered: Bachelor of Science in Education

The department's aim is to enable students to gain provisional certification, success in teaching, and an understanding of the processes of intentional socialization.

■ **Professional Preparation**

The Department of Education provides teacher preparation programs in a variety of fields and at several levels. It also offers basic and advanced courses in the humanities and behavioral sciences for students in education, human services, and other human development professions.

■ **Five-Year Cooperative Education Program**

Effective October 1, 1994, all students seeking teacher certification at any grade level (N–12) will need to earn a bachelor's degree with a major or interdisciplinary major in the liberal arts and sciences. Students seeking certification as an early childhood or an elementary teacher will complete a joint program between the College of Arts and Sciences and Boston-Bouvé College of Human Development Professions.

Early Childhood Education Students seeking certification in early childhood education will enter a dual-major program consisting of a major in the College of Arts and Sciences and an early childhood education major in Boston-Bouvé College. This broad academic background, combined with experiences in cooperative education, permits the development of a cohesive professional base. Pre-student teaching in appropriate field settings is an integral part of several required courses. The Russell J. Call Children's Center provides experiences in fieldwork for students in the early childhood education program.

Elementary Education Students who will be candidates for certification as an elementary education teacher will enter a dual-major program consisting of a major in the College of Arts and Sciences and the elementary education major in Boston-Bouvé College. The competencies necessary for teaching come from four sources: course work, experiences in the Cooperative Plan of Education, prepracticum field activities, and the student-teaching practicum.

Secondary Education Certification candidates must complete a major and certain core requirements in the College of Arts and Sciences and a minor in secondary education. Students preparing to teach biology, chemistry, earth science, English, history, mathematics, physics, or Spanish in the schools of Massachusetts can major in these respective fields. Those majoring in economics, philosophy, political science, or sociology may pursue state certification in the teaching of social studies.

Specified competencies established for certification in Massachusetts may be acquired through cooperative education experiences, designated courses, and a quarter of full-time student teaching, arranged by the University's Department of Education.

■ **Accreditation**

The elementary education, early childhood education, health education, and physical education teacher preparation programs are accredited by the Massachusetts Department of Education.

■ **Requirements for Teacher Preparation***

Early Childhood Major

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|---------------------------------------|-------------|----------------------------------|-------------|
| Education for the Future | 4 | Elementary School Science and | |
| Human Development and Learning I | 4 | Mathematics | 4 |
| Analysis of the Instructional Process | 4 | Student Teaching | 8 |
| Day Care and Nursery School | 4 | Introduction to | |
| Language and Cognition | 4 | Special Education | 4 |
| Measurement and Evaluation | 4 | Early Childhood Perceptual Motor | |
| Seminar in Early Childhood | | Development | 4 |
| Development | 4 | Beginning Computer Use | 4 |
| Fundamentals of Reading | 4 | Professional Development | 1 |
| Literature and Learning Materials | 4 | Middler-Year Writing Requirement | 4 |
| Elementary Curriculum I and II | 8 | | |

Elementary Education Major

| Course | Q.H. | Course | Q.H. |
|---|------|-----------------------------------|------|
| Education for the Future | 4 | Student Teaching | 4 |
| Human Development and Learning I | 4 | Introduction to Special Education | 4 |
| Analysis of the Instructional Process | 4 | Movement Education | 4 |
| Measurement and Evaluation | 4 | Beginning Computer Use | 4 |
| Fundamentals of Reading | 4 | Professional Development | 1 |
| Literature and Learning Materials | 4 | Middler-Year Writing Requirement | 4 |
| Elementary Curriculum I and II | 8 | Designated Electives | 8 |
| Elementary School Science and Mathematics | 4 | | |

*Minimum graduation requirements: early childhood major—177 Q.H.; elementary major—176 Q.H.; with secondary education minor—176 Q.H.

■ Student Teaching

Student teaching is a full-time experience for one complete academic quarter during the senior year. A professor and a cooperating classroom teacher share supervisory responsibility.

Student teachers receive support from the Reading Center (page 225), the F. André Favat Center (page 215), and the Russell J. Call Children's Center (page 99).

■ Teacher Certification

As of October 1, 1994, all students seeking teacher certification at any grade level (N-12) in the Commonwealth of Massachusetts will need to earn a bachelor's degree with a major or interdisciplinary major in the liberal arts and sciences. In addition, candidates for provisional certification will need to provide evidence that appropriate course work in education as well as prepracticum and student teaching assignments have been successfully completed.

The requirements for obtaining certification for teaching vary from state to state. Graduates are responsible for determining the requirements of the states in which they are interested.

Department of Health, Sport, and Leisure Studies

Carl S. Christensen, Ph.D., *Professor and Chairman*

| | | |
|-----------------------------|-----------------------------|---------------------------|
| <i>Professor</i> | William J. Gillespie, Ed.D. | Donald Schneider, Ph.D. |
| Richard C. Zobel, Ed.D. | Dorett M. Hope, Ed.D. | Charles A. Starkey, Ph.D. |
| <i>Associate Professors</i> | Richard B. Morrison, Ed.D. | <i>Instructor</i> |
| Marilyn A. Cairns, Sc.D. | Judith A. Noblitt, M.Ed. | George B. Ransom, Ed.D. |
| Robert S. Curtin, Ed.D. | <i>Assistant Professors</i> | <i>Lecturer</i> |
| Kathleen Davis, Ph.D. | George R. Atkinson, Ed.D. | Wendy Gammons, M.S. |
| Elaine G. Eliopoulos, Ed.D. | Glenn A. Boden, M.Ed. | |
| M. Patricia Fetter, Ph.D. | D. Sue Graham, Ph.D. | |

Degrees Offered: Bachelor of Science in Education,
Bachelor of Science in Recreation and Leisure Studies

The department provides program specializations and services, conducts research, and disseminates findings on how health, sport, and leisure improve the quality of life. Faculty are committed to pre- and in-service preparation of practitioners to serve people of all ages and also to the scholarly investigation related to the six program specializations offered by the department.

■ Five-Year Cooperative Education Programs

The department offers programs in athletic training, cardiovascular health and exercise, school and community health education, physical education teacher preparation, recreation management, and therapeutic recreation.

All students in this department are expected to maintain a specific quality-point average at each class level (see the current *Student Handbook for the Basic Colleges*).

Athletic Training

Degree Offered: Bachelor of Science in Education

■ Professional Preparation

The athletic trainer plays an important role not only in professional sports, but also in the organized and recreational activities of people from all walks of life. An important link between the athlete, the coach, and the physician, the athletic trainer provides services in preventing, treating, and rehabilitating sports injuries. The trainer's duties include advising on proper conditioning techniques to help reduce injury, assessing the severity of injuries that do occur and administering basic first aid, and supervising post-injury rehabilitation programs.

In general, athletic trainers work in organized sports—either for secondary school or college athletic teams or for professional teams engaged in a variety of sports.

■ Five-Year Cooperative Education Program

This five-year Bachelor of Science in Education program is designed specifically for students interested in careers as athletic trainers. The program is approved by the National Athletic Trainers' Association.

Students interested in the athletic training program major must be accepted into Northeastern's Department of Health, Sport, and Leisure Studies (see Undergraduate Admissions, page 9). Students may petition for acceptance into the athletic training program after successfully completing their first year of academic study. To be accepted into the program, applicants must maintain at least a 1.85 (C+) quality-point average during their second year. In order to complete the athletic training program, students must complete a minimum of 1,000 hours work with athletic teams in approved settings.

■ Accreditation

The professional program specialization in athletic training is approved by the National Athletic Trainers Association.

■ Certification

Students who graduate from the athletic training program are eligible to sit for the National Athletic Trainers Association Certification Examination. Upon passing the examination, an individual is eligible to apply for Massachusetts state licensure in athletic training. Certification in athletic training does not guarantee a position in the profession.

■ Course Requirements*

General (Freshmen–year one)

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|------------------------------------|-------------|-----------------------|-------------|
| English I and II | 8 | Computer Use | 4 |
| Biology I and II | 8 | First Aid | 2 |
| Chemistry I and II | 10 | Issues in Health | 4 |
| Mathematics | 4 | Physical Conditioning | 1 |
| Social Science I | 4 | | |
| Foundations of Psychology | 4 | | |
| Physical Education Skill electives | 2 | | |

Upperclass (years two–five)

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|-----------------------------------|-------------|-------------------------------------|-------------|
| Anatomy/Physiology I and II | 8 | Kinesiology | 4 |
| Human Development II | 4 | Statistics | 4 |
| Physics I and II | 8 | Psychology I and II | 8 |
| Basic Athletic Training | 3 | Middle-Year Writing Requirement | 4 |
| Basic Athletic Training Lab | 1 | Therapeutic Reconditioning | 4 |
| Clinical Athletic Training | 2 | Motor Development | 4 |
| Research Methods | 4 | Administration of Athletic Training | 4 |
| Exercise Physiology | 4 | Nutrition | 4 |
| Advanced Athletic Training | 4 | Psychology of Sport | 2 |
| Physical Conditioning Programming | 2 | Overview of Disabilities | 4 |
| General Studies electives | 5 | Athletic Training Internship | 12 |
| Senior Seminar | 4 | Drug Use and Abuse | 4 |
| Therapeutic Modalities | 4 | Mental Health | 4 |
| Weight Training | 1 | Department electives | 8 |

*Graduation requirements: 181 Q.H. pending curriculum revisions.

Cardiovascular Health and Exercise

Degree Offered: Bachelor of Science in Education

■ Professional Preparation

Students interested in careers as preventive/rehabilitative exercise technologists and specialists or as health and fitness instructors in private and public agencies, commercial health and fitness centers, hospitals and outpatient clinics, or businesses and corporations may obtain a bachelor of science degree in this program.

■ Five-Year Cooperative Education Program

The program specialization in cardiovascular health and exercise focuses on how the health and exercise sciences relate to physical fitness, health promotion, and primary and secondary prevention of cardiovascular disease. To the applied science base, students add courses designed to help them acquire the knowledge and skills necessary for physical and health assessment, exercise testing, exercise prescription, and program development and supervision for adults in preventive and rehabilitative health and exercise programs.

■ Certification

Successful completion of the program specialization prepares the student to sit for the certification examination for preventive/rehabilitative exercise technologist or specialist conducted by the American College of Sports Medicine.

■ **Basic Course Requirements***

General (Freshmen—year one)

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|------------------|-------------|-----------------------|-------------|
| Computer Use | 4 | Mathematics | 4 |
| Biology I and II | 8 | Current Health Issues | 4 |
| English I and II | 8 | First Aid | 2 |
| Psychology | 4 | Weight Training | 1 |
| Sociology | 4 | Swimming | 1 |
| Chemistry I | 5 | Physical Conditioning | 1 |
| Electives | 4 | | |

Upperclass (years two–five)

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|------------------------------------|-------------|-----------------------------------|-------------|
| Anatomy/Physiology I and II | 8 | Statistics | 4 |
| Motor Development | 4 | Introduction to Counseling | 4 |
| Chemistry I and II | 10 | Measurement and Evaluation | 4 |
| Basic Athletic Training | 3 | Exercise Physiology | 4 |
| Basic Athletic Training Lab | 1 | Commercial Recreation Marketing | 4 |
| Psychology I | 4 | Budget Analysis | 4 |
| Communicable/Degenerative Diseases | 4 | Exercise Testing Prescription | 3 |
| Health Counseling | 4 | Electrocardiography | 4 |
| Community Health | 4 | Physical Conditioning Programming | 2 |
| Special Problems | 4 | Nutrition | 4 |
| Kinesiology | 4 | Middler-Year Writing Requirement | 4 |
| Aerobic Exercise | 1 | Supervised Field Experience | 12 |
| Wellness | 4 | Electives | 20 |

*Minimum graduation requirement—178 Q.H. and a grade of C (2.0) or better in all professional courses.

Note: A grade of C or better is required in each professional course prior to field experience.

Physical Education Teacher Preparation

Degree Offered: Bachelor of Science in Education

■ **Professional Preparation**

Physical education students who prepare for professional careers as elementary and secondary physical education teachers and coaches in public and private schools need not be limited to those careers. Their expertise is often welcomed in community agencies, business, government, and industry, where the need exists for physical activity, sports, fitness, and health entrepreneurs.

■ **Five-Year Cooperative Education Program**

Students in this program must select a major from within the College of Arts and Sciences (such as anthropology, history, psychology, or sociology) to augment extensive course work in physical education (theoretical foundations, applied science, pedagogy, and activity courses). Accordingly, each student has two advisors, one from Physical Education and one from Arts and Sciences.

Field experience comes both as an extension of regular course work and from student teaching in the Greater Boston area. Student teaching follows the completion of several major courses in pedagogy and must be consistent with the certification level being sought.

The combination of a broad liberal arts background, a technical specialization, and supervised practice teaching places program graduates in an excellent position to apply for prized jobs.

■ Graduation Requirements

Degree candidates must complete a minimum of 180 quarter hours and have a 2.5 quality-point average in all required department courses *prior to* supervised student teaching.

■ Certification

On October 1, 1994, the Commonwealth of Massachusetts implements a two-stage certification plan for all teachers (N–12). Provisional certification is temporary; it must be followed within five years by the completion of a discipline-appropriate master's degree. Full certification follows the completion of the master's degree.

Provisional certification candidates must earn a bachelor's degree with a major in the sciences or liberal arts, provide evidence of the required course work in physical education and the prepracticum, and provide evidence of successful completion of practice teaching.

Note Massachusetts is a member of the Interstate Certification Commission, an organization that handles teacher certification reciprocity among many—but not all—states. However, teacher certification requirements vary from state to state; it is the candidate's responsibility to determine the requirements of a particular state.

Recreation Management

Degree Offered: Bachelor of Science in Recreation and Leisure Studies

■ Professional Preparation

The academic and work experiences in recreation management are designed to help the student develop those skills most necessary to obtain entry-level management positions in commercial, government, and nonprofit recreation. Students wishing to continue their education seek admission to Master of Business Administration (M.B.A.), Master of Public Administration (M.P.A.) degree programs, or Master of Science in Sports or Recreation Management (M.S.).

The Cooperative Plan of Education provides opportunities for professional work experiences in health clubs, racquet clubs, resorts, tourism agencies, government, and nonprofit agencies.

■ Five-Year Cooperative Education Program

Students in the recreation management specialization have the opportunity to develop highly marketable job skills. The academic work places heavy emphasis on the behavioral sciences applied to leisure and managerial settings. An intensive in-residence program in leadership and human relations at the University's Warren Center in Ashland, 25 miles west of Boston, serves as a practical laboratory (see page 99).

Equal emphasis is placed on developing a working knowledge of marketing, budgeting, planning, evaluation, and computer applications in the leisure industry. The case method of teaching is widely used to help students identify and solve practical problems facing recreation managers in the commercial and nonprofit sectors.

■ Course Requirements*

General (Freshmen–year one)

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|----------------------|-------------|---------------------------------------|-------------|
| Biology I | 4 | Foundations of Leadership and Leisure | |
| English I and II | 8 | Services | 4 |
| Social Science | 4 | Computer Use | 4 |
| Life/Career Planning | 4 | Education elective | 4 |
| Health Issues | 4 | Professional Skills | 4 |
| Group Dynamics | 3 | Mathematics | 4 |
| Speech Fundamentals | 3 | | |

Upperclass (years two–five)

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|--|-------------|---------------------------------------|-------------|
| Human Development I and II | 8 | Elements of Outdoor Recreation | |
| Anatomy/Physiology I and II | 8 | Planning | 4 |
| Introduction to Recreation and Leisure | | Organizational Behavior | 3 |
| Services | 3 | Management of Recreation and Physical | |
| Research Applications | 4 | Education | 4 |
| Program Planning | 4 | Program Evaluation | 4 |
| Commercial Recreation Marketing | 4 | Social and Psychological Impacts of | |
| Internship Seminar | 1 | Illness and Disabilities | 4 |
| Internship in Recreation Management | 12 | Concepts of Leisure | 4 |
| Senior Seminar | 4 | Therapeutic Recreation elective | 4 |
| Guided electives | 16 | Social/Psychological Aspects | |
| Research Methods | 4 | of Disabilities | 4 |
| Behavioral/Social Science electives | 8 | Middler-Year Writing Requirement | 4 |
| Budget Analysis | 4 | | |

*Minimum graduation requirement—173 Q.H.

School and Community Health Education

Degree Offered: Bachelor of Science in Education

Health education is concerned with improving individual and community health through educational activities. Working in volunteer health agencies, public health clinics, elementary and secondary schools, and health-planning organizations, health educators facilitate behavior changes to enrich the quality of life. They use techniques and information from both medicine and education to help individuals and communities deal with emotional, physical, and social aspects of health.

■ Professional Preparation

Professional preparation in school health education differs from community health education in the application of fieldwork or internship experiences. The former applies fieldwork in public or private school settings, while the latter applies fieldwork to other agencies such as clinics, hospitals, or state and local health departments.

■ Five-Year Cooperative Education Program

Since health has psychological, physical, and social components, this major is organized to help students develop an understanding of each of these areas. Courses during the first part of the program emphasize the foundations of health education in the social and life sciences. Practical experience in health education is available throughout the program, to provide the student with an opportunity to apply theory and techniques. Major courses on contemporary health issues help the student understand the details and complexities of health topics.

This program of study is intended to produce graduates with the competence to assess the health education needs of groups and to develop, organize, and evaluate effective educational activities. Throughout the program of study, the concepts of prevention, health promotion, wellness, and holistic health serve as common threads. The development of specific competencies for health education roles is an objective of the program, and there is the opportunity to specialize in school health education or community health education.

Students selecting an emphasis in school health education must meet state certification requirements for field experiences in prepracticums and the practicum in a secondary school setting. Both programs require 180 quarter hours and a cumulative quality-point average of 2.5 in all required department courses.

■ Certification

School Health Education Upon successful completion of the requirements for graduation in school health education, students are eligible to apply for certification to teach (grades 5–12) in the Commonwealth of Massachusetts. On October 1, 1994, the Commonwealth of Massachusetts implements a two-stage certification plan for all teachers (N–12). Provisional certification is temporary; it must be followed within five years by the completion of a discipline-appropriate master's degree. Full certification follows the completion of the master's degree.

Provisional certification candidates must earn a bachelor's degree with a major in the sciences or liberal arts, provide evidence of the required course work in health education and the prepracticum, and provide evidence of successful completion of practice teaching.

Note Massachusetts is a member of the Interstate Certification Commission, an organization that handles teacher certification reciprocity among many—but not all—states. However, teacher certification requirements vary from state to state; it is the candidate's responsibility to determine the requirements of a particular state.

Community Health There are no certification criteria for students in community health education. However, all students must satisfy departmental requirements before being approved for graduation.

Health Education The program in school and community health education is concerned with the health of the University community. In an attempt to meet the health needs of students, the University regularly offers several elective courses on selected health issues of potential personal and professional interest, such as nutrition, sexuality, mental health, consumer health, drug use/abuse, and aging. Lectures, discussion groups, and demonstrations provide students with the opportunity to understand the significance and application of recent health-related research findings in their own lives.

■ Related Department Activities

Dance Theatre The Northeastern University Dance Theatre offers students interested in dance as a performing art the opportunity to choreograph and/or perform in concert. In addition to an annual University concert production, this group presents several lecture-demonstrations and/or community concerts each year. Admission to the dance group is by audition.

Physical Education A broad selection of electives in dance, sports, aquatics, and fitness activities is offered to all University students. All classes are open to men or women, with instructional modifications where appropriate. Classes are subject to cancellation if enrollments are too low.

Health, Sport, and Leisure Club Organized by students in the department, the Health, Sport and Leisure Club participates in projects of student interest that relate to departmental and professional concerns or issues. The club plans guest speakers, student workshops, information exchanges, orientation programs for new students, and a volunteer service for local programs.

Department of Physical Therapy

David A. Lake, Ph.D., *Assistant Professor and Acting Chairman*

| | | |
|-----------------------------|------------------------------|------------------------------|
| <i>Associate Professor</i> | <i>Lecturer</i> | Nancy B. Goldin, M.Ed. |
| Meredith H. Harris, Ed.D. | Shirley A. Stockmeyer, M.A. | Mary O'Brien, M.P.H. |
| <i>Assistant Professors</i> | <i>Clinical Supervisors/</i> | Nancy L. Seaver, M.P.T. |
| Arlene C. Antilla, Ph.D. | <i>Clinical Instructors</i> | <i>Cooperative Education</i> |
| Robert Sikes, Ph.D. | Cindy I. Buchanan, M.S. | <i>Coordinators</i> |
| Mary D. Slavin, Ph.D. | Ann L. Charrette, M.A. | Betsey W. Blackmer, Ed.D. |
| | Marguerite Geer, M.A. | Ann C. Noonan, Ed.D. |
| | Lisa M. Giallonardo, M.S. | |

Degree Offered: Bachelor of Science in Physical Therapy

The Department of Physical Therapy is dedicated to the preparation of therapists who can provide patient care of the highest quality in a time of changing concepts, trends, and challenges. Students have the opportunity to acquire the skill to help patients gain functional independence and to learn to recognize and assist with emotional and socioeconomic problems that affect recovery.

■ Professional Preparation

Physical therapy is one of the health professions contributing to the delivery of comprehensive health care. Physical therapists are highly skilled in evaluation procedures and in the planning and execution of treatment programs appropriate to a patient's condition or disabilities. Additional responsibilities may include health-care planning and community service.

Physical therapists are employed in private practice or in such institutions as general hospitals, children's hospitals, university hospitals, rehabilitation centers, schools or centers for disabled children, extended-care facilities, freestanding outpatient clinics, home-health agencies, and community, state, and federal agencies. Teaching and research positions, on the rise, offer additional opportunities.

■ Five-Year Cooperative Education Program

The five-year program in physical therapy, based on the Cooperative Plan of Education, is unique in physical therapy education. It integrates liberal arts and sciences and professional courses, with major emphasis on liberal arts in the first two years and on professional preparation in the last three. The professional courses cover such subjects as anatomy, kinesiology, pathology, clinical medicine, neurology, orthopedics, physiology, physical therapy procedures, administration, and research. In addition, clinical experience is provided in various hospitals and clinics.

Clinical specialists from Boston University School of Medicine, Tufts–New England Medical Center Hospital, the Beth Israel Hospital, and many regional hospitals, as well as from medical and social agencies in the Boston area, augment the professional staff in the physical therapy program.

Clinical affiliation is a professional requirement which provides opportunities to practice various facets of physical therapy under supervision. The clinical experience satisfies eligibility criteria for state licensure. Assignments in clinical education

are not confined to the Boston area. They may include physical therapy departments across the United States. Students on clinical education assignments should plan on additional expenses, including travel.

Physical Therapy Club Organized by students, the Physical Therapy Club participates in projects which reflect student concerns and interests. The PT Club sponsors student, faculty, and guest presentations on professional issues and its members participate in open house activities, new student orientation, the Big Brother/Big Sister program, and departmental peer tutoring.

Requirements Students admitted to the Department of Physical Therapy must maintain acceptable standards of scholarship and performance in the prescribed program; demonstrate good health, verbal fluency, essential motor skills, and emotional maturity; complete all required courses; and have favorable evaluations from clinical education and co-op experience. To progress in the program, students must maintain a grade of C (2.0) or better in all professional courses and in all basic science prerequisite courses listed in the academic policy statement of the Department of Physical Therapy. Students are expected to adhere to all policies described in this policy statement and should contact the Department of Physical Therapy for information on departmental academic policies and procedures.

To progress into the middler year, students must have completed all freshman and sophomore prerequisite courses, including all basic science and professional courses, with a grade of C or better. Physical therapy students may not continue in the program upon earning a grade lower than C in three different science and/or professional courses. In addition, an earned grade lower than C for the second time in the same science and/or professional course precludes continuation in the program. These requirements include the professional courses Supervised Clinical Education I and II.

Transfer Students Transfer students from other colleges and universities (external transfers) and from other majors and colleges within Northeastern University (internal transfers) are admitted to the freshman and sophomore years of the physical therapy program based upon academic achievement and the availability of space in a particular graduating class. Consideration will be given to those transfer applicants who have achieved a minimum quality-point average of B (3.0).

■ **Accreditation**

The curriculum in physical therapy is accredited by the American Physical Therapy Association.

■ **Sample Freshman-Year Program**

First Quarter

Foundations of Psychology I
Fundamentals of Mathematics
General Chemistry I
Current Issues in Health
First Aid

Second Quarter

Introduction to Human Anatomy
and Physiology I
General Chemistry II
Freshman English I
Introduction to Physical Therapy I

Third Quarter

Introduction to Human Anatomy
and Physiology II
Freshman English II
Beginning Computer Use
Functional and Basic Calculus

Note: In addition to the above courses, students may choose to take Basic ROTC.

■ Course Requirements*

General

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|---|-------------|---|-------------|
| Fundamentals of Mathematics [†] | 8 | Lab: Physics Life Sciences I [‡] | 1 |
| English [†] | 8 | Introduction to Human Anatomy and Physiology I, II, III ^{†‡} | 12 |
| General Chemistry [†] | 10 | Foundations of Psychology I [†] | 4 |
| Current Issues in Health [†] | 4 | 6 General electives | 24 |
| First Aid [†] | 2 | Foundations of Psychology II [†] | 4 |
| Physics for Life Sciences I [‡] | 4 | Beginning Computer Use [†] | 4 |
| Physics for Life Sciences II [†] | 4 | | |

Professional

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|--|-------------|---|-------------|
| Introduction to Physical Therapy I [†] | 2 | Middler-Year Writing Requirement | 1 |
| Introduction to Physical Therapy II [‡] | 2 | Physical Therapy V (continued) | 1 |
| Developmental Basis of Human Performance | 4 | Neuroanatomy | 5 |
| Clinical Gross Anatomy | 6 | Physical Therapy VII | 2 |
| Physiology for Physical Therapists | 5 | Physical Therapy VIII | 4 |
| Physical Therapy I | 2 | Research for Physical Therapy | 4 |
| Clinical Medicine I, II, III | 10 | Psychosocial Aspects of Illness | 3 |
| Clinical Kinesiology | 5 | Physical Therapy in the Health-Care System | 3 |
| Physical Therapy II | 3 | Investigative Studies | 6 |
| Physical Therapy III | 4 | Functional Assessment of the Elderly Client | 3 |
| Physical Therapy IV | 3 | Supervised Clinical Education II | 0 |
| Supervised Clinical Education I | 5 | Clinical Seminar | 2 |
| Physical Therapy V | 4 | Administration | 4 |
| Physical Therapy VI | 3 | | |

*Minimum graduation requirement—185 Q.H.

[†]These courses are usually taken in the freshman year.

[‡]These courses are usually taken in the sophomore year.

Note: Computer literacy must be demonstrated prior to entering the middler year. The Middler-Year Writing Requirement must be satisfied in conjunction with Psychosocial Aspects of Illness.

Human Services

John D. Herzog, Ph.D., *Department of Education, Acting Director and Professor*
 Wilfred E. Holton, Ph.D., *Department of Sociology, Director and Associate Professor*

| | | |
|---|---|---|
| <i>Advisory Committee</i> | Lawrence Litwack, Ed.D., <i>Counseling Psychology,</i> | Harold S. Zamansky, Ph.D., <i>Psychology</i> |
| Wilfred E. Holton, Ph.D. | <i>Rehabilitation, and</i> | <i>Fieldwork Supervisor</i> |
| Maureen E. Kelleher, Ph.D. | <i>Special Education</i> | Natalie H. Riffin, M.Ed., O.T.R. |
| Gordana Rabrenovic, Ph.D., <i>Sociology/Anthropology</i> | Barbara Schram, Ed.D., <i>Education</i> | |
| Louise La Fontaine, Ed.D. | | |

Degree Offered: Bachelor of Science in Education, Bachelor of Arts (Arts and Sciences)

Human services is an interdisciplinary major involving the Boston-Bouvé College of Human Development Professions and the College of Arts and Sciences. It may lead to careers in the helping professions or to graduate specializations.

■ Professional Preparation

Students who major in human services prepare for jobs in public and private agencies. Graduates have found opportunities in such areas as administration, community organizing, counseling, serving deaf clients, working with delinquent youth as a court liaison, researching and evaluating social programs, doing case

work in social service agencies, sheltered workshops, mental health settings, and staffing halfway houses, penal institutions, and drug treatment centers.

■ The Major

The Human Services Program offers an extensive advisory system to help students make the best use of course opportunities and to guide them in the choice of major specializations and in career planning.

■ Graduation Requirements

The overall requirements for each participating college differ in certain respects. Refer to pages 53–55 for requirements in the College of Arts and Sciences. Boston-Bouvé students complete a five-year cooperative education program. The basic aspects of the program are as follows:

Prerequisite courses Prescribed courses in counseling, sociology, psychology, government, economics, and human services, for a total of six courses.

Core courses Nine courses in counseling, statistics, research methods, group process, organizations, personality, intervention strategies, and a senior seminar.

Social and community issues Three courses from a list of recommended options in the areas of African-American studies, special education, poverty, or social problems.

Specializations A five-course program developed in conjunction with an adviser in a subfield of human services. These specializations are usually in administrative, community, or clinical fields. Specializations have been developed in deaf studies, aging, administration, business, speech and hearing therapy.

Fieldwork Two 150-hour fieldwork placements during the last two years of the program. Students must apply for fieldwork assignments early in the quarter before the fieldwork will be done. Students have found placements in community programs, nursing homes, vocational workshops, state and federal agencies, and recreational facilities. Cooperative education job placements provide additional opportunities to put classroom knowledge and personal talents to work.

■ Related Activities

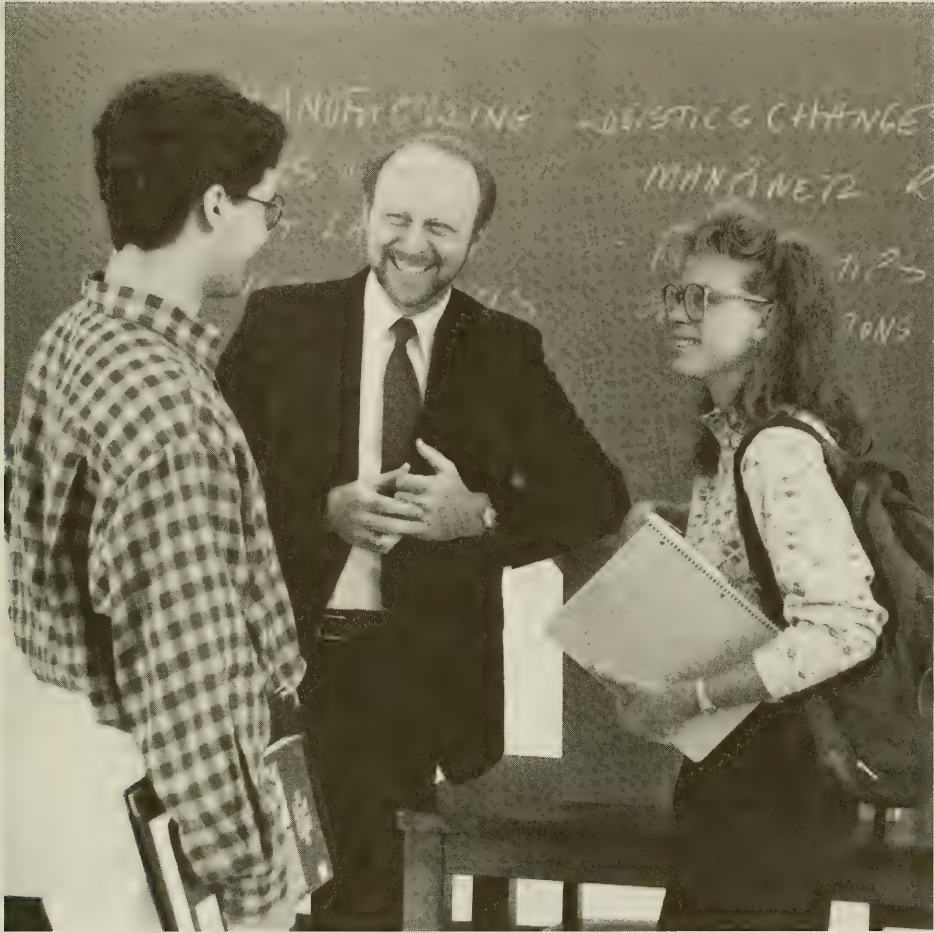
The Human Services Student Organization combines social and career-related activities. This group has organized open houses, bake sales, clothing drives, meals for the homeless, social activities, day-long conferences, and weekend retreats.

Students and faculty publish the *Human Services Newsletter*. They also co-lead the Fenway Project, a campus office that recruits, places, and supports student volunteers in social, educational, and recreational agencies in Northeastern's neighborhood. Project volunteers have worked with senior citizens, school-age children, patients from a health clinic, and other groups. The year culminates in a community fair, the Fenfest, attended by students and neighborhood residents. The Fenway Project began in 1973 through the auspices of Boston-Bouvé College and has been administered by the Human Services Program since 1986.

■ Related Programs

See American Sign Language Programs, Business Minor, Elementary Spanish Course for Criminal Justice and Human Services Majors, International Programs, Irish Studies Program, Linguistics Minor, and Women's Studies Minor in the Special Programs section, which begins on page 86.

College of Business Administration



David P. Boyd, Ph.D., *Dean*

Roger M. Atherton, Jr., Ph.D., *Associate Dean*

Jay A. Halfond, Ph.D., *Associate Dean*

Dennis Ramsier, M.B.A., *Assistant Dean (Undergraduate Program)*

Joseph P. Zolner, M.P.P.M., *Director (Graduate School)*

Accounting Group

Professors

Ronald M. Copeland, Ph.D.,

Lillian L. and

Harry A. Cowan Research

Professor of Accounting

Joseph R. Curran, Ph.D.

Paul A. Janell, Ph.D.,

Joseph M. Golemme

Professor of Accounting

Russell W. Olive, D.B.A.

Arnold Wright, Ph.D.

Associate Professors

Sharon M. McKinnon, Ph.D.

H. David Sherman, D.B.A.

Assistant Professors

James P. Angelini, Ph.D.

Janice DiPietro, Ph.D.

Bairj Donabedian, Ph.D.

Mario J. Maletta, B.S.

Thomas W. Oliver, Ph.D.

Robert G. Ruland, Ph.D.

John Schatzel, Ph.D.

Lecturers

Michael D. Cottrill, M.S., C.P.A.

William Siddall, M.B.A.

Finance and Insurance Group

Professors

Wesley W. Marple, D.B.A.
Joseph W. Meador, Ph.D.
Jonathan B. Welch, Ph.D.

Associate Professors

Jeffrey A. Born, Ph.D.
Donald G. Margotta, Ph.D.
Coleen C. Pantalone, Ph.D.
Harlan D. Platt, Ph.D.

Assistant Professors

Swaminathan Badrinath,
Ph.D.
Jay N. Ball, Ph.D.
Paul J. Bolster, Ph.D.
Marc Bremer, Ph.D.
Hugo J. Faria, Ph.D.
Steven D. Felgran, Ph.D.
Peggy L. Fletcher, M.B.A.

Yash P. Joshi, M.B.A.
Shirley Love, M.B.A.
Edward M. Saunders, Ph.D.
Venkatesan Srinivasan, Ph.D.
Emery A. Trahan, Ph.D.

Lecturers

Alan D. Alford, M.B.A.
Daryl E. J. Gurley, M.B.A.

General Management Group

Professors

Roger M. Atherton, Ph.D.
Charles D. Baker, M.B.A.
John Diffenbach, D.B.A.
Robert C. Lieb, D.B.A.
Daniel J. McCarthy, D.B.A.
Seymour Tilles, D.B.A.
Heidi Vernon-Wortzel, Ph.D.

Associate Professors

Stanley R. Berkowitz, J.D.
William F. Crittenden, Ph.D.
Robert H. Ketchum, Ph.D.
Raymond M. Kinnunen, D.B.A.
James F. Molloy, Jr., Ph.D.
Ravi Ramamurti, Ph.D.
Ravi Sarathy, Ph.D.
Robert W. Stuart, Ph.D.

Assistant Professors

Marc H. Meyer, Ph.D.
Alvin G. Wint, Ph.D.

Lecturers

James S. Cook, A.B.
Mary F. Costello, J.D.
Robert Goldberg, M.B.A.
Eugene M. Salorio, M.B.A.
Ronald Thomas, M.A.

Human Resources Group

Professors

David P. Boyd, Ph.D.
Richard B. Higgins, Ph.D.
Ralph Katz, Ph.D.

Associate Professors

Rae Andre, Ph.D.
Brendan D. Bannister, Ph.D.

Thomas M. Begley, Ph.D.
Edward F. McDonough III,
Ph.D.
Frank J. Minor, Ph.D.
Andre P. Priem, M.A.
Bert A. Spector, Ph.D.
Francis C. Spital, Ph.D.
Edward G. Wertheim, Ph.D.

Assistant Professors

Joseph M. Czajka III, Ph.D.
Richard D. Jette, Ph.D.
Cynthia Lee, Ph.D.
Sheila M. Puffer, Ph.D.
Kirsten Wever, Ph.D.

Lecturers

Lucinda Doran, M.F.A.
Jeffrey A. Mello, M.B.A.

Management Science Group

Professors

Michael J. Maggard, Ph.D.
Robert A. Millen, Ph.D.

Associate Professors

R. Balachandra, Ph.D.
Peter J. Billington, Ph.D.
Allen G. Burgess, Ph.D.
Sangit Chatterjee, Ph.D.

Kathleen Foley Curley, D.B.A.
Victor B. Godin, D.B.A.
Allen S. Lee, Ph.D.
Carl W. Nelson, Ph.D.
Robert A. Parsons, M.B.A.
Majorie Platt, Ph.D.
Marius M. Solomon, Ph.D.
Eileen Trauth, Ph.D.
Mustafa R. Yilmaz, Ph.D.

Assistant Professors

Maylun Buck-Lew, Ph.D.
Maria-Cecilia Carrera, M.S.
Stephanie J. Collins, B.B.A.
Allen G. Greenwood, Ph.D.
Pradeep K. Kedia, Ph.D.
Hokey Min, Ph.D.
Bharat C. Ruparel, D.B.A.

Lecturer

Richard Briotta, M.B.A.

Marketing Group

Professors

Robert J. Minichiello, D.B.A.
Samuel Rabino, Ph.D.
Frederick Wiseman, Ph.D.

Associate Professors

Dan T. Dunn, D.B.A.
Robert F. Young, D.B.A.

Assistant Professors

Gloria Barczak, Ph.D.
Deirdre M. Bird, Ph.D.
Kristina Cannon-Bonventre,
Ph.D.
Diane Cermak, Ph.D.
John Friar, Ph.D.

Lynn J. Jaffe, Ph.D.
Linda Jamieson, Ph.D.
Saul Klein, Ph.D.
Keith B. Murray, Ph.D.
Shubhro Sen, M.S.
Harlan E. Spotts, M.B.A.

Degree Offered: Bachelor of Science in Business Administration

The programs in the College of Business Administration are designed for men and women seeking to prepare themselves for managerial responsibility. These programs seek to develop the ability to recognize and solve problems and to understand the role of the business firm in the community, the nation, and the world. In developing these skills, students have the opportunity not only to gain a broad understanding of business and organizational problems through specialized courses, but also to observe effective solutions first-hand.

In keeping with current trends in collegiate education, the college has adopted the following educational aims:

- to develop attitudes and ideals that are ethically sound and socially desirable;
- to cultivate an awareness of the social, political, and economic developments to which the business firm must adapt;
- to develop the habits of accurate thinking essential to sound judgment and accurate expression essential to effective communication;
- to provide an opportunity to develop a specialization in business in accordance with one's interests and talents.

■ **Professional Preparation**

The outlook for business administration careers in the '90s is optimistic. The challenges that business faces from unprecedented political change, the effects of foreign policy, high technology, affirmative-action regulations, and new economic policies enhance the demand for highly trained individuals equipped to analyze the complex social and legal problems of our modern-day economy.

In general, students find that graduate schools view a Bachelor of Science degree in Business Administration as solid preparation for graduate work, not only in business but also in public administration, health-care administration, and education administration. Many careers in law are also directly involved in the business world, either in large corporations or in private practice. Law schools look favorably on the prelegal background obtained in business school. Although the Association of American Law Schools does not recommend particular courses or curricula for prelegal students, it does advise undergraduates to develop critical understanding of the institutions and values with which the law deals.

■ **Five-Year Cooperative Education Program**

The College of Business Administration offers concentrations in the principal fields of business: accounting, entrepreneurship and small-business management, finance and insurance, human resources management, international business, management, management information systems, marketing, and logistics and transportation. Its business curriculum combines with courses from the sciences, humanities, and social sciences to equip students with the well-rounded background that is so valuable in the business world.

All students in the college are required to complete—in addition to their academic courses—the Cooperative Plan of Education. This program gives students the opportunity to challenge and reinforce in the workplace theories and techniques learned in the classroom. Cooperative education experiences generally are paid, full-time professional positions. Work assignments are for six months of each year above the freshman-year level.

The final three years emphasize the various functional areas of business and require students to concentrate in specific areas. (See pages 117-127 for detailed descriptions.) In most upper-division courses, a traditional lecture-and-recitation format is supplemented by problem solving and case studies. Students are encour-

aged to think independently, to support ideas with fact and logic, and to analyze and challenge propositions. Special classrooms have been designed for the college to facilitate the case method of instruction.

■ **Honors Program**

The College of Business Administration is part of the University Honors program. See page 18. The college also offers academically outstanding juniors and seniors the opportunity to participate in specially designed courses and an optional senior thesis project.

■ **Graduation Requirements**

Candidates for the bachelor of science degree must complete all of the prescribed work of the curriculum in which they seek to qualify. This currently totals 176 quarter hours of credit. The degree conferred not only represents the formal completion of selected courses of study, but also indicates professional study in the designated area of concentration. Both a quality-point average of C (2.0) and a C average in all business courses are necessary for graduation.

Students must be enrolled in a full program of studies in the College of Business Administration during the final three quarters immediately preceding graduation.

■ **Graduation with Honors** See page 49.

■ **The Minor**

The College of Business Administration faculty, realizing that many students may have an interest in business yet major in other disciplines, offers a minor in business administration.

The minor provides a background that serves as a foundation for the study of business and its various areas. In addition, students explore the relationship between business and society and the obligations of each to the other.

Non-business students of the Basic Colleges may find the minor particularly attractive if they are considering a career in business and/or are contemplating enrolling in an M.B.A. program. Qualified students who have completed the five background and methodology courses may apply for formal admission to the minor after they have accumulated 80 or more quarter hours of credit.

■ **Minor in Business Administration Program**

| Background and Methodology* | | Business Functions | |
|-----------------------------------|------|----------------------------|------|
| Course | Q.H. | Course | Q.H. |
| College Algebra | 4 | Introduction to Business | 4 |
| Macroeconomics | 4 | Introduction to Accounting | 4 |
| Microeconomics | 4 | Organizational Behavior | 4 |
| Descriptive Statistics | 4 | Introduction to Finance | 4 |
| Inferential Statistics | 4 | Introduction to Marketing | 4 |
| | | Operations Management | 4 |
| Total Quarter Hours | | Total Quarter Hours | 24 |
| | | | |
| Business and Its Environment | | | |
| Course | Q.H. | | |
| One course from the approved list | 4 | | |
| Total Quarter Hours | 4 | | |

*Completed prior to formal entry into the minor.

■ **Accreditation**

The undergraduate program of the College of Business Administration, accredited by the American Assembly of Collegiate Schools of Business, meets that accrediting agency's standards for faculty and student quality, curriculum design, and overall University support.

■ **Sample Freshman-Year Program**

The sample freshman-year program and the basic course requirements for the College of Business Administration are the same for all concentration areas. The College of Business Administration has no physical education requirement. Students wishing to take courses in physical education may take a maximum of eight quarter hours as elective credits.

First Quarter

Introduction to Business
Two nonbusiness electives
Economics (macro)

Second Quarter

Calculus for Business
Freshman English I
Two nonbusiness electives

Third Quarter

Freshman English II
Two nonbusiness electives
Economics (micro)

■ **Course Requirements**

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|--|-------------|------------------------------------|-------------|
| Calculus for Business | 4 | Statistics I and II | 8 |
| Quantitative Models in Business English* | 8 | Computer-based Information Systems | 4 |
| Introduction to Business | 4 | Organizational Behavior | 4 |
| Accounting I and II | 8 | Complex Organizations | 4 |
| Economics (macro) | 4 | Operations Management | 4 |
| Economics (micro) | 4 | Managing Social Issues | 4 |
| Introduction to Finance I and II | 8 | Business Policy | 4 |
| Introduction to Marketing | 4 | Nonbusiness electives† | 44 |
| | | Open electives‡ | 28 |

*In addition, all students must complete the Upper Division Writing Requirement (normally taken by business students in the junior year).

†For international business majors, eight quarter hours of this total must be from the international list. For all other students, four quarter hours must be from the international list.

‡For accounting concentrators, 24 Q.H.

■ **Graduate Education** For information on graduate degrees, see page 205.

Accounting Concentration

Accounting is a fast-growing and critical area of business. It is an exacting field that requires men and women who enjoy dealing with facts and figures as well as with people. It requires accuracy and an ability to reason and to interpret business data.

■ **Professional Preparation**

The College of Business Administration offers a variety of financial accounting and managerial accounting courses.

Preparation for an accounting career either in industry or in public accounting encompasses a broad range of activities. These include all phases of record keeping,

internal and external reporting, financial planning, cost control, the design and installation of systems and procedures, the application of electronic and other modern business methods to these activities, and managerial decision making.

■ **Five-Year Cooperative Education Program**

During the first two years, accounting students have the opportunity to develop communication and analytical skills, to gain an understanding of the nature of accounting, and to survey business as a dynamic institution in an economic setting. Also important is consultation with a coordinator from the Department of Cooperative Education about future work assignments.

Subjects in the third year include courses in the various functional areas of business (marketing, finance, operations, personnel), statistical analysis, and economic activity.

Whether a student chooses employment in the industrial accounting or public accounting area, he or she will have the opportunity to take specialized courses in the third and subsequent years. Subjects include cost accounting, accounting theory, planning and control, auditing, and taxes.

In addition to the sample program and basic course requirements listed on page 117, students who concentrate in accounting are required to take the courses below.

Professional Requirements

| <i>Course</i> | <i>Q.H.</i> |
|--|-------------|
| Intermediate Accounting I, II, and III | 12 |
| Cost Accounting | 4 |
| Accounting Systems | 4 |
| Federal Income Taxes | 4 |
| Auditing | 4 |

Entrepreneurship and Small Business Management Concentration

The concentration in entrepreneurship and small business management offers students who plan to work in or operate their own businesses an opportunity to develop the skills necessary for the effective management of small enterprises. A concentration in this field offers a thorough “start-to-finish” perspective. To this end, the concentration provides courses that deal with these key questions:

- What are the characteristics of people who start their own companies, and what does it take to start and build a new business?
- What are some key sources of business opportunities, and how does one assess the feasibility of a particular venture?
- What sources exist for raising seed capital, and how does one acquire it?
- What are the critical problems and opportunities in successfully managing a smaller company, and what are the appropriate managerial methods?
- What are the key issues in financing and managing an ongoing, growing venture, and how can these be applied to small businesses?

■ **Professional Preparation**

Students who choose this concentration have a wide variety of motivations and goals. Some have hopes of starting or acquiring and operating their own businesses. Others may join a family business upon graduation. Still others favor either a small business or a large corporation. All share an entrepreneurial spirit, which in recent

years many large corporations have begun to encourage through the development of entrepreneurial programs.

Some students are considering a career in sales management, banking, public accounting, management consulting, or other areas that may involve them directly with owners and managers of new and small companies. For example, a bank loan officer, sales manager, or CPA would often have many entrepreneurs and small-company officers as clients.

■ **Five-Year Cooperative Education Program**

Courses in this concentration benefit students in several ways. They offer the opportunity to develop an ability to assess personal aptitude and potential for small business, to find and evaluate business opportunities, to secure adequate funding, and to organize and manage the various functional facets of the small business—manufacturing, marketing, finance, control, and personnel.

The freshman-year program of studies and the basic course requirements for the College of Business Administration are the same for all the concentration areas. (See page 117.) The professional course requirements are as follows:

Requirements

| <i>Course</i> | <i>Q.H.</i> |
|--|-------------|
| Management of Smaller Enterprises | 4 |
| Opportunity Analysis and Venture Capital | 4 |
| Small Business Finance | 4 |
| New Venture Creation | 4 |
| Small Business Institute Field Project | 8 |

Finance and Insurance Concentration

The objective of the finance and insurance concentration is to train students for the financial management of businesses, nonprofit organizations, and governmental units. Preparation is twofold:

- to offer information about current practices, theories, and concepts of financial management;
- to provide experience in analyzing situations that require financial decisions.

■ **Professional Preparation**

Almost every phase of economic activity involves aspects of financial management—of cash or other funds and of economic resources available to the individual, business, or any other economic unit.

The finance and insurance concentration can help prepare students for careers in one of the many areas of funds management: security analysis, estate planning, corporate finance and control, financial planning, security or insurance brokerage, underwriting, credit management, and banking.

There are also career possibilities in the specific financial institutions that perform indispensable services for present-day business and industry. Among these are banks, insurance companies, investment houses, credit concerns, financial service institutions, mortgage companies, and national and local real estate brokerage firms and appraisers.

Career openings can be sought in all areas of business, industry, and government, wherever financial planning and operation are vital.

■ **Five-Year Cooperative Education Program**

In the middler year, students take Introduction to Finance I and II and beginning courses in other business fields. Following the introductory courses, the required courses are Managerial Finance, Investment Management, and Financial Institutions and Markets. Electives are available, grouped within six subfields: managerial finance, investment management, management of financial institutions, insurance, real estate, and personal financial planning.

All courses offered in finance and insurance are open to students in any concentration within the College of Business Administration provided they have taken the prerequisite subjects. Instructors may waive prerequisite courses in special circumstances.

The freshman-year program of studies and the basic course requirements for the College of Business Administration are the same for all areas of concentration. (See page 117.) The professional course requirements in finance and insurance subfields are as follows:

Requirements

| <i>Course</i> | <i>Q.H.</i> |
|------------------------------------|-------------|
| Managerial Finance | 4 |
| Financial Institutions and Markets | 4 |
| Investment Management | 4 |
| Finance electives | 12 |

Insurance and Risk Management Specialization Risk management is the process of identifying, measuring, evaluating, and treating important risks. It is a relatively new, but growing, part of the management function in business as well as in government and other nonprofit organizations. Insurance is an important method of risk financing in all organizations, including the family unit. Some individuals may study one or a few courses in insurance and risk management to broaden their understanding of this area in order to manage their personal affairs better or to familiarize themselves with this area as part of their general management preparation. Others may wish to specialize in this area and seek careers in the risk management function in business as managers of corporate employee benefits programs; as managers, adjusters, or underwriters in life insurance companies, property and liability insurance companies, insurance brokerage firms, insurance agencies, and independent adjusting firms. Career options are numerous.

Investment and Management Analysis Specialization Two benefits result from studying this specialization. First, students can gain a general understanding, which may help them manage their own affairs. Second, those seeking professional careers in organizations where the investment function is paramount (for example, industrial and utility corporations, real estate developments, financial institutions, and many governmental agencies) will find this specialization of great assistance.

The specialization offers preparation in the skills and principles that can benefit students who are interested in careers as investment managers or security analysts in the following organizations: stock exchanges, investment advisory firms, brokers-dealers, underwriters, mutual funds, and other investment companies that are a part of the securities markets; insurance companies, commercial banks, savings and loan associations, trust companies, mutual savings associations, and organizations involved in the activities of the securities markets; federal and state governmental agencies such as the SEC, FDIC, Treasury Department, IRS, and others having regulatory responsibilities regarding the securities markets and their participants.

Managerial Finance Specialization The aim of the finance function in the contemporary corporation or business entity is twofold: to provide needed funds on terms that are the most favorable in view of current planning and to regulate the flow of funds to maximize the realization of objectives.

The key concerns of financial management are the capital structure of the business and the optimal manner in which its assets should be held. With only minor differences, these same broad objectives apply to the finance function of nonprofit organizations, including those in the public sector (units of government).

Management of Financial Institutions Specialization This specialization is broadly based within the subject area and is applicable to a variety of financial institutions and positions within them. The three major topics of consideration in this area of specialization are the institutional structure of the financial system and the relation between it and the surplus and deficit units of the whole economy; asset, liability, and capital management problems of financial intermediaries; and investment analysis and portfolio management policies appropriate to different financial intermediaries.

Personal Financial Planning Specialization Deregulation of the financial sector has caused the number and complexity of investment alternatives to increase, making personal financial management a growth specialization. Various financial institutions require individuals to evaluate the financial needs of the investor and to create a portfolio of direct and indirect investments. In addition, any individual with financial assets needs some knowledge of the personal financial management process to better meet his or her financial needs over time. Topics in this specialization include portfolio analysis, insurance, real estate, and personal financial management.

Individuals who specialize in this subfield may work as financial planners for such financial institutions as commercial banks, savings and loan associations, savings banks, life insurance companies, trust departments, and financial planning companies.

Real Estate Specialization The real estate specialization exposes students to the criteria, objectives, and risks of investments in real estate. The uncertain economic environment of the last decade has made this specialization particularly attractive. Topics include legal and financial considerations, internal and external factors determining site use, macro- and microeconomic analysis, and federal income tax implications.

Specialization in this subfield prepares the student for opportunities in equity investment organizations, real estate marketing organizations, mortgage banking associations, and primary mortgage lending sources (life insurance companies, real estate investment trusts, commercial and mutual savings banks, pension funds, and trust departments).

Human Resources Management Concentration

Human resources management, which focuses on the effective utilization of people at work, is an extension of personnel and labor relations. However, it includes more than the traditional areas of employee relations, recruitment, selection, compensation, and training. A human resources manager also must be knowledgeable about staffing, equal employment opportunity laws and affirmative-action procedures, organizational development, career planning, job design and motivation, leadership, and communications. The ultimate goal of human resources managers is to provide their organizations with highly effective employees.

■ **Professional Preparation**

In recent years increased attention has been paid to the quality of the employee's work life and its relation to the efficient production of goods and services. At a time when financial resources and investment capital are becoming scarcer, many organizations are beginning to take a closer look at the management of their people, their most precious resource. In recognition of this growing interest, Northeastern University's College of Business Administration offers an undergraduate concentration in human resources management.

The effective management of human resources calls for a partnership among such organizational specialists as personnel administrators, labor relations negotiators, wage and salary analysts, and operating line managers in the various functional areas (marketing, finance, production) of the company. As the traditional role of personnel administration is expanded to include affirmative-action programs, job enrichment, and organizational development activities, career opportunities in the fields of labor relations and personnel administration are likely to expand in both the public and private sectors.

Students whose career aspirations lie in fields other than personnel and labor relations should not think of human resources management as a specialized activity confined to the personnel department. Whether graduates start their careers as work-flow analysts in manufacturing, customer service assistants in marketing, field auditors in an accounting department, or hospital unit managers, they will be required to demonstrate skills in working with individuals and groups to achieve desired results.

■ **Five-Year Cooperative Education Program**

Human resources management is practiced not only by specialists in the area of personnel and labor relations, but also by line managers and specialists in many other business areas. The human resources management concentration is structured to expose students to all major functions of personnel administration and labor relations.

The freshman-year program of studies and the basic course requirements for the College of Business Administration are the same for all the concentration areas. (See page 117.) The professional course requirements for human resources management students are as follows:

Requirements

| <i>Course</i> | <i>Q.H.</i> |
|--|-------------|
| Introduction to Human Resources Management | 4 |
| Selection and Performance Appraisal | 4 |
| Contemporary Labor Issues | 4 |
| Reward and Compensation Systems | 4 |
| Human Resources Management electives | 8 |

International Business Concentration

The recent growth of multinational firms, international trade, and regional international trading blocs has created a shortage of skilled managers who are equipped to analyze the complexities of international business.

Careers in international business are best pursued in companies that carry on service, trade, or manufacturing operations in foreign countries. More and more, multinational firms require that candidates for top management positions have prior experience in international operations. In addition, large banks and insurance companies want their managers to understand international business. Other types of organizations—government, trade associations, and transnational bodies—require international business knowledge. Foreign travel is frequently a part of the job.

■ Professional Preparation

The international business concentration offers students the opportunity to prepare themselves to meet the numerous management needs outlined above. It fosters development of an understanding of problems involved in operating business enterprises across national boundaries and of the ability to analyze the operations of businesses in multinational environments.

Students who choose the international business concentration have the opportunity to gain an understanding of the economic, political, and social constraints on international business and to develop skills in analyzing the financial, marketing, and operational strategies of the multinational firm.

■ Five-Year Cooperative Education Program

The curriculum consists of a broad education provided by course requirements in arts and sciences, a basic business education provided by business administration core requirements, and a specialized education in international business.

The international business concentration consists of six courses. Three of them are required: Introduction to International Business, International Financial Markets, and Seminar in International Business. There are also three electives, two from the international business list and one from the business list. In addition, two of the nonbusiness electives in the basic course requirements must be chosen from the international list. (See page 124.)

The international business concentration permits a dual concentration. For example, a student may concentrate in international business and use open electives to fulfill the requirement of a second concentration. The dual concentration has advantages for those seeking employment opportunities in traditional functional areas (production, marketing, finance), which also take place in an international setting. All College of Business Administration courses offered as part of the international business concentration are available to students in other concentrations during their middler, junior, and senior years.

Arts and sciences electives such as modern languages, political science, international economics, geography, cultural anthropology, philosophy, religious studies, and history—all appropriate to the understanding of international relations—are highly recommended to complement this concentration.

The freshman-year program of studies and the basic course requirements for the College of Business Administration are the same for all the concentration areas. (See page 117.)

Professional Requirements

| <i>Course</i> | <i>Q.H.</i> |
|--|-------------|
| Introduction to International Business | 4 |
| International Financial Markets | 4 |
| Seminar in International Business | 4 |
| International Business electives | 8 |
| Business elective | 4 |

■ International Electives

Business List*

Comparative International Management
Cultural Aspects of Business
Environmental Pressures and Corporations
International Finance
International Financial Markets
International Human Resources
Management
International Labor Relations
International Marketing
International Transportation

Nonbusiness List†

Africa Today
American Foreign Policy
Arab-Israeli Conflict
Business German, French, and Spanish
China's Foreign Relations
Communism in Eastern Europe
Communism and Revolution
Comparative Economics
Contemporary Japanese Society and Culture
Development Economics
Economic History of Less Developed Countries
Economics of World Energy
Euro-Communism

Europe Since 1921
European Economic Development
European Political Parties
Government and Politics in the Middle East
Government and Politics of China
Government and Politics of Japan
Government and Politics of Latin America
History of Modern Italy
International Economics
International Law
International Organization
Introduction to Foreign Governments
Introduction to International Relations
Introduction to the Third World
Modern African Civilization
Modern France
Modern Western Economic History
Peoples and Culture of China
The Politics—Policies of Developing Nations
Social Change and Economic Development
Soviet Foreign Policy
Soviet Government
Soviet Russia
Third World Political Relations
World Politics

*These courses are not offered every year. Students are advised to consult preregistration material.

†This is a representative listing; other liberal arts courses may be taken upon approval of the area coordinator for the international business concentration.

Logistics and Transportation Concentration

Logistics and transportation is an integral part of national and international distribution systems. It is a determining factor in the availability and prices of goods and services in our economy.

■ Professional Preparation

In corporate distribution, transportation specialists operate within a complex organizational framework in which goods are stored and moved. Effective management of this distribution process involves understanding inventory control, warehousing, transportation options, and the interaction of these activities with other functional operations.

Growing concern over the economic and service conditions of the transportation industry has created careers with government agencies engaged in transportation policy development and administration. Other career possibilities exist with carriers such as airlines, railroads, and trucking companies, which actively recruit people familiar with the operational and regulatory aspects of their businesses.

■ Five-Year Cooperative Education Program

The concentration offers students a balanced background in logistics and transportation. Courses cover not only the viewpoint of the corporate shipper and carriers but also that of public officials, in addition to consumer interests. Courses have a strong contemporary orientation and promote frequent interaction with practitioners from business and government.

Course offerings in transportation and physical distribution management are sequential so that students who desire only an introductory exposure may take one or several courses as part of a broader business background. An undergraduate concentration in the area consists of six courses. Three are required courses, with the balance of the concentration composed of electives.

The freshman-year program of studies and the basic course requirements for the College of Business Administration are the same for all the concentration areas. (See page 117.) The professional course requirements for logistics and transportation students are as follows:

Requirements

| <i>Course</i> | <i>Q.H.</i> |
|---|-------------|
| Domestic Transportation System | 4 |
| Corporate Transportation/Logistics | 4 |
| Seminar in Transportation and Distribution | 4 |
| Transportation electives | 12 |

Management Concentration

Management is an area of business that involves men and women who enjoy working with numbers as well as with people. Basically, it is the process of getting things done through people by using basic business skills developed in a well-rounded program of business administration.

■ Professional Preparation

For the student whose career interests lie in the broad area of administration rather than in specialized fields, the management concentration offers the opportunity to prepare for a wide variety of administrative careers in business, in government, and in nonprofit institutions.

■ Five-Year Cooperative Education Program

Management students must have a basic understanding of all organization functions: accounting, marketing, finance, and operations. Courses in these subjects offer an overview, including the interrelation of these areas and the ways they can be used as management tools. A similar approach is used in courses in other areas. Faculty pay significant attention to "people problems" to stress the importance of developing an effective work force.

The courses in the management concentration vary considerably in content and method of instruction because they vary in objectives. The purpose of this participatory approach is to help prepare students for the demands of management in the business community.

The curriculum and teaching methods center around the development of basic skills and knowledge appropriate to administration, rather than on specialized functional techniques. Although the case study method is used extensively, a variety of teaching methods consistent with particular course objectives is employed. The basic objectives of the concentration are to confront students with appropriate learning experiences, to help them increase their skills in and knowledge of basic

disciplines underlying administrative practice, and to help them develop judgment and skills in organizational problem analysis and decision making.

The freshman-year program of studies and the basic course requirements for the College of Business Administration are the same for all the concentration areas. (See page 117.) The professional course requirements for management students are as follows:

Requirements

| <i>Course</i> | <i>Q.H.</i> |
|--|-------------|
| Cost Accounting for Management | 4 |
| Introduction to Human Resources Management | 4 |
| Legal Aspects of Business | 4 |
| Business electives | 12 |

Management Information Systems Concentration

■ **Professional Preparation**

The growth in the application of information technology in organizations is one of the most remarkable features of the late twentieth century. No longer are computers placed behind glass walls to be approached only by a handful of cognoscenti. Now hardware and software are found in all corners of organizations, and the proliferation shows no signs of slowing down. Familiarity with this technology is necessary for any position in an organization.

The Management Information Systems (MIS) concentration has been created to teach tomorrow's managers how to use information technology to its fullest potential in performing their duties. Students who elect this concentration will probably not compete with graduates of computer science or industrial engineering/information systems degree programs. Nor are they expected to become analyst/programmers. Instead, they will most likely move into one of the functional areas of management, using their MIS skills to link that area with employers' information systems resources. Students interested in an MIS concentration are encouraged to consider working toward a second concentration in one of the functional areas of management. Therefore, many careers are possible in this rapidly expanding field.

■ **Five-Year Cooperative Education Program**

The proliferation of information systems technology may be viewed as taking two distinct tracks. The first builds on the historical development of large and powerful computers that carry out organization-wide tasks, such as database management. The second track is the more recent one. Beginning with the appearance of time-sharing systems in the late 1960s and culminating in the personal computer revolution of the 1980s, this track deals with the direct linkage of decision makers with user-friendly computer facilities. This second track is often referred to as end-user computing.

The MIS concentration provides the student with background in both of these tracks as well as in the complex issues of the integration of information technology with corporate strategy. The concentration is composed of six courses. Two are taken in each of the middler, junior, and senior years. The freshman-year program of studies and the basic course requirements for the College of Business Administration are the same for all concentration areas. (See page 117.) The professional course requirements for MIS students are as follows:

Requirements

| <i>Course</i> | <i>Q.H.</i> |
|--------------------------------|-------------|
| End-User Computing | 4 |
| Business Programming I | 4 |
| Business Programming II | 4 |
| Systems Analysis and Design | 4 |
| Database Management Systems | 4 |
| Management Information Systems | 4 |

Marketing Concentration

A business organization not only designs and manufactures products but also markets and sells them to manufacturers, wholesalers, retailers, and consumers. The marketing concentration focuses on these processes.

All the business activities that direct the flow of goods and services from producer to consumer are classified as marketing concerns. The marketing process begins by determining the needs and wants of customers. Once these wants and needs are established, the organization's first objective is to produce goods or services to satisfy a particular consumer. Essential in all types of business are such activities as product design, research, pricing, packaging, transportation, advertising, selling, and servicing. The overall responsibility for these functions rests with the marketing manager.

Without successful marketing, industrial and consumer products remain unsold. More and more companies are finding that today's pace and high levels of production require up-to-date marketing techniques to generate higher sales volumes.

■ Professional Preparation

Students of marketing can choose career options in a range of settings—in the public and private sectors of the economy, in product or service marketing, in profit or not-for-profit organizations—as well as in a variety of support functions, such as market research, consulting, advising government regulators, advertising, and new product development.

As members of the management policy group, marketing executives take a broad view of all aspects of business management and policy. They also serve effectively as trained specialists in their own areas.

■ Five-Year Cooperative Education Program

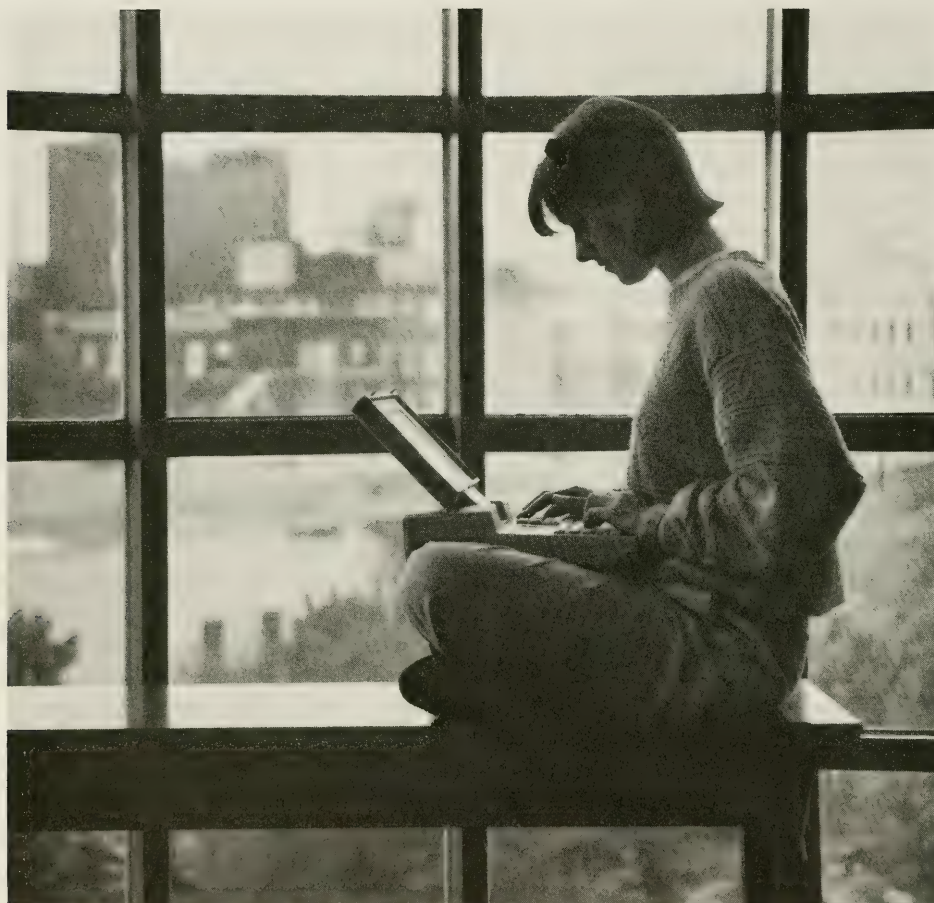
The marketing concentration offers a wide range of courses, taught by lecture and class discussion. Included are such courses as Marketing Management, Advertising Management, Sales Management, Consumer Behavior, Competitive Strategy, and Marketing Research Management.

The freshman-year program of studies and the basic course requirements for the College of Business Administration are the same for all the concentration areas. (See page 117.) The professional course requirements for marketing students are as follows:

Requirements

| <i>Course</i> | <i>Q.H.</i> |
|----------------------|-------------|
| Marketing Management | 4 |
| Marketing Research | 4 |
| Competitive Strategy | 4 |
| Marketing electives | 12 |

College of Computer Science



Cynthia A. Brown, Ph.D., *Acting Dean*

Mitchell Wand, Ph.D., *Associate Dean and Director of Graduate Studies*

Richard A. Rasala, Ph.D., *Director of Undergraduate Studies*

Terry M. Smith, M.S., *Coordinator of Undergraduate Student Services*

Marie P. Hinds, B.S., *Assistant to the Dean*

Professors

Harriet J. Fell, Ph.D.

Larry A. Finkelstein, Ph.D.

Karl J. Lieberherr, Ph.D.

Richard A. Rasala, Ph.D.

Betty J. Salzberg, Ph.D.

Alan L. Selman, Ph.D.

Raoul N. Smith, Ph.D.

Mitchell Wand, Ph.D.

Patrick S. P. Wang, Ph.D.

Joint Professor

R. Mark Goresky, Ph.D.,

Mathematics

Associate Professors

Kenneth P. Baclawski, Ph.D.

Cynthia A. Brown, Ph.D.

John Casey, B.A.

Agnes H. Chan, Ph.D.

Gene D. Cooperman, Ph.D.

Robert P. Futrelle, Ph.D.

Carole D. Hafner, Ph.D.

Viera K. Proulx, Ph.D.

Ronald J. Williams, Ph.D.

Assistant Professors

Khaled M. Bugrara, Ph.D.

Philip F. Carrigan, Ph.D.

John M. Gauch, Ph.D.

Andrew M. Klapper, Ph.D.

Luc Longpré, Ph.D.

Degrees Offered: Bachelor of Arts, Bachelor of Science in Computer Science

A fundamental goal of the college is to help students develop the ability to recognize and solve problems arising in the use of modern digital computers. Computer science is a multifaceted discipline. It spans parts of pure mathematics and applied mathematics; it touches physics through solid state devices; it pushes at the borders of biology and psychology in its attempts to understand and replicate intelligence. In its study of computer architectures and the complexity of VLSI design, it shares common ground with electrical engineering. Finally, its database and information systems and computer graphics support business and commerce.

■ Professional Preparation

The College of Computer Science program is designed to prepare computer science students for careers in industry, government, or the private sector. In general, graduates will help organizations design, develop, market, or utilize computing systems.

Some graduates become software designers, systems analysts, business or scientific applications programmers, marketers, or salespersons of technologically advanced products. Others become entrepreneurs and founders of their own firms.

Computer science may be broadly subdivided into four areas: applications, systems, theory, and technology.

Applications Applications focuses on the creation of the software that makes computers useful. Instruction and research projects are devoted to the development of applications software. Expert systems, database systems, computer graphics, symbolic computation, computer-aided instruction, and numerical simulations are only a few of the many specific applications.

Systems Systems centers on the design of the large-scale programs that are the software core of a functioning computer—operating systems, programming languages, compilers, debuggers, and editors, among others. Additional areas of investigation include artificial intelligence, networks, parallel processing, compiler design, and software engineering.

Theory Theory deals with the design and analysis of algorithms, the building and testing of large programs, the design of programming languages, and the development of tools to handle concurrent processes, parallel computation, and networks. Specific areas of investigation in theoretical computer science are algorithms for artificial intelligence systems, networks and parallel computation, cryptography, graph theory, and program verification.

Technology This area focuses on the identification of appropriate machine architecture for each of the interests discussed. The actual design of hardware is left to engineering departments and to industrial hardware designers.

Computer science students have the opportunity to assimilate ideas and concepts from theoretical studies; to engage in in-depth, hands-on programming of both large time-sharing systems and single-user microcomputers; and to develop professional insight gained from cooperative education.

Bachelor of Arts in Computer Science Program

The Bachelor of Arts program was instituted by the College of Computer Science in 1989. It emphasizes computer science within the liberal arts tradition and has a science and mathematics base.

Computer science requirements stress theoretical foundations and analysis of methods. Mathematics requirements support this fundamental approach. For natural science electives, degree candidates may choose from biology, chemistry, geology, and physics.

Choice and breadth of knowledge are highly valued. Degree requirements are modeled on the core curriculum of the College of Arts and Sciences. In addition to writing requirements, students must take a variety of courses in social sciences and humanities. Degree candidates must also achieve proficiency in a foreign language.

Requirements are flexible enough to allow those students who wish to combine the study of computer science with that of another discipline for a minor concentration. Those who wish to pursue an interdisciplinary study involving several areas may also fashion an appropriate program with the help of a faculty advisor.

Bachelor of Science in Computer Science Program

The Bachelor of Science is the original degree program offered by the College of Computer Science. It emphasizes a sophisticated study of computer science and related areas of mathematics, physics, and electrical engineering.

Students examine general principles and their implementation in several important classes of computer systems: database management systems, operating systems, and language processing systems. Students must acquire an in-depth understanding of one of these system areas.

Software design principles and practices are stressed through large projects. In addition, students have the opportunity to learn about the theoretical foundations of computer science and computer graphics, as well as artificial intelligence.

Students are encouraged to relate their work in science and technology to the larger world. Required courses include writing, basic social sciences, and the relationship of computers to society. At least two additional elective courses must be in social sciences or humanities.

Students must also take a group of five related non-computer science courses (a block called a subarea), choosing from more than 30 subarea plans or creating a plan of their own. The subarea requirement guarantees that students will have some knowledge of the issues, problems, and methodologies of another discipline. Those students interested in further work in their subarea may use general electives to expand the subarea into a minor concentration or to explore different fields.

■ Honors Program

The College of Computer Science participates in the University Honors Program. See page 18.

■ Graduation with Honors See page 49.

■ The Minor

The College of Computer Science offers a minor to non-computer science students. Faculty approval is required. Four required level-one courses must be completed, and then three additional computer science courses may be elected. This minor is particularly valuable to those students seeking positions where a familiarity with computer science concepts and techniques is desirable.

■ **Accreditation**

The college's Bachelor of Science in Computer Science Program has been accredited by the Computer Science Accreditation Commission of the Computing Sciences Accreditation Board, Inc. The board was established by the Association of Computing Machinery (ACM) and the Computer Society of the Institute of Electrical and Electronic Engineers (IEEE-CS), the two largest membership societies specializing in computing and related areas.

- **Graduate Education** For information on graduate degrees, see page 206.

Four- and Five-Year Cooperative Education Programs

The undergraduate curricula of the Bachelor of Arts and the Bachelor of Science degree programs are administered in five-year and four-year cooperative education programs that incorporate alternating periods of classroom instruction and career-oriented work experience, extending from the second through the fifth year. A student in the five-year program normally spends eleven quarters in classes and seven quarters on co-op assignments, whereas a student in the four-year program spends eleven quarters in classes and four quarters on co-op assignments.

■ **Co-op Plan for the Computer Science Five-Year Program**

In these schedules, quarters with numbers mean quarters in school at Northeastern. Co-op and vacation quarters are so labeled.

Five-year students have a common freshman schedule. At the option of the student, the vacation may be used as an additional co-op quarter.

| | Fall | Winter | Spring | Summer |
|-----------------|-------------|---------------|---------------|---------------|
| <i>Freshman</i> | 1 | 2 | 3 | vacation |

After the freshman year, students are divided into two divisions and follow one of the two schedules below:

| | Fall | Winter | Spring | Summer |
|------------------|-------------|---------------|---------------|---------------|
| <i>Sophomore</i> | 4 | co-op | 5 | co-op |
| <i>Middler</i> | co-op | 6 | co-op | 7 |
| <i>Junior</i> | 8 | co-op | 9 | co-op |
| <i>Senior</i> | co-op | 10 | 11 | — |

| | Fall | Winter | Spring | Summer |
|------------------|-------------|---------------|---------------|---------------|
| <i>Sophomore</i> | co-op | 4 | co-op | 5 |
| <i>Middler</i> | 6 | co-op | 7 | co-op |
| <i>Junior</i> | co-op | 8 | co-op | 9 |
| <i>Senior</i> | 10 | co-op | 11 | — |

■ **Sample Five-Year Bachelor of Arts Program**

(Computer Science Courses Starting in the Second Year)

First Year

First Quarter

| <i>Course</i> | <i>Q.H.</i> |
|--------------------|-------------|
| Calculus I | 4 |
| Freshman English I | 4 |
| Science (1) | 4 |
| Core (1) | 4 |

Second Quarter

| <i>Course</i> | <i>Q.H.</i> |
|----------------------|-------------|
| Calculus II | 4 |
| General elective (1) | 4 |
| Science (2) | 4 |
| Core (2) | 4 |

Third Quarter

| <i>Course</i> | <i>Q.H.</i> |
|----------------------|-------------|
| Calculus III | 4 |
| Freshman English II | 4 |
| General elective (1) | 4 |
| Science (3) | 4 |

Second Year

Fourth Quarter

| <i>Course</i> | <i>Q.H.</i> |
|----------------------------------|-------------|
| Fundamentals of Computer Science | 4 |
| Computer Science Overview I | 1 |
| Discrete Mathematics I | 4 |
| Core (3) | 4 |
| Core (4) | 4 |

Fifth Quarter

| <i>Course</i> | <i>Q.H.</i> |
|----------------------------------|-------------|
| Algorithms and Data Structures I | 4 |
| Computer Science Overview II | 1 |
| Discrete Mathematics II | 4 |
| Core (5) | 4 |
| Core (6) | 4 |

Third Year

Sixth Quarter

| <i>Course</i> | <i>Q.H.</i> |
|-----------------------------------|-------------|
| Algorithms and Data Structures II | 4 |
| Computer Organization I | 4 |
| General elective (2) | 4 |
| Core (7) | 4 |

Seventh Quarter

| <i>Course</i> | <i>Q.H.</i> |
|---|-------------|
| Automata and Formal Languages | 4 |
| Functional Programming and Applications | 4 |
| C Laboratory | 1 |
| Middle-Year Writing Requirement | 4 |
| Core (8) | 4 |

Fourth Year

Eighth Quarter

| <i>Course</i> | <i>Q.H.</i> |
|--------------------------------|-------------|
| Analysis of Algorithms | 4 |
| Linear Algebra | 4 |
| Computers and Society (Core 9) | 4 |
| General elective (4) | 4 |

Ninth Quarter

| <i>Course</i> | <i>Q.H.</i> |
|-----------------------------------|-------------|
| Analysis of Programming Languages | 4 |
| Computer Science elective (1) | 4 |
| General elective (5) | 4 |
| Core (10) | 4 |

Fifth Year

Tenth Quarter

| <i>Course</i> | <i>Q.H.</i> |
|-------------------------------|-------------|
| Computer Science elective (2) | 4 |
| Computer Science elective (3) | 4 |
| General elective (6) | 4 |
| Core (11) | 4 |

Eleventh Quarter

| <i>Course</i> | <i>Q.H.</i> |
|-------------------------------|-------------|
| Senior Seminar | 1 |
| Computer Science elective (4) | 4 |
| General elective (7) | 4 |
| General elective (8) | 4 |
| Core (12) | 4 |

■ Sample Five-Year Bachelor of Science Program

First Year

First Quarter

| <i>Course</i> | <i>Q.H.</i> |
|----------------------------------|-------------|
| Fundamentals of Computer Science | 4 |
| Computer Science Overview I | 1 |
| Calculus I | 4 |
| Freshman English I | 4 |
| Basic Social Science (1) | 4 |

Second Quarter

| <i>Course</i> | <i>Q.H.</i> |
|----------------------------------|-------------|
| Algorithms and Data Structures I | 4 |
| Computer Science Overview II | 1 |
| Calculus II | 4 |
| Discrete Mathematics I | 4 |
| Basic Social Science (2) | 4 |

Third Quarter

| <i>Course</i> | <i>Q.H.</i> |
|-----------------------------------|-------------|
| Algorithms and Data Structures II | 4 |
| FORTTRAN Laboratory | 1 |
| Calculus III | 4 |
| Freshman English II | 4 |
| Subarea/general elective (1) | 4 |

Second Year

Fourth Quarter

| <i>Course</i> | <i>Q.H.</i> |
|---|-------------|
| Computer Organization and Programming I | 4 |
| Calculus IV | 4 |
| Physics I | 4 |
| Physics Laboratory I | 1 |
| Subarea/general elective (2) | 4 |

Fifth Quarter

| <i>Course</i> | <i>Q.H.</i> |
|--|-------------|
| Computer Organization and Programming II | 4 |
| C Laboratory | 1 |
| Discrete Mathematics II | 4 |
| Physics II | 4 |
| Physics Laboratory II | 1 |
| Subarea/general elective (3) | 4 |

Third Year

Sixth Quarter

| <i>Course</i> | <i>Q.H.</i> |
|------------------------------|-------------|
| Systems Programming | 4 |
| Physics III | 4 |
| Computer Engineering | 4 |
| Digital Systems Laboratory | 1 |
| Subarea/general elective (4) | 4 |

Seventh Quarter

| <i>Course</i> | <i>Q.H.</i> |
|---|-------------|
| Functional Programming and Applications | 4 |
| Automata and Formal Languages | 4 |
| Technical Writing | 4 |
| Subarea/general elective (5) | 4 |

Fourth Year

Eighth Quarter

| <i>Course</i> | <i>Q.H.</i> |
|-------------------------------|-------------|
| File Structures | 4 |
| Computer Science elective (1) | 4 |
| Linear Algebra | 4 |
| Computers and Society | 4 |

Ninth Quarter

| <i>Course</i> | <i>Q.H.</i> |
|-------------------------------|-------------|
| Software Design | 4 |
| Computer Science elective (2) | 4 |
| Probability | 4 |
| Subarea/general elective (6) | 4 |

Fifth Year

Tenth Quarter

| <i>Course</i> | <i>Q.H.</i> |
|-------------------------------|-------------|
| Computer Science elective (3) | 4 |
| Computer Science elective (4) | 4 |
| Subarea/general elective (7) | 4 |
| Subarea/general elective (8) | 4 |

Eleventh Quarter

| <i>Course</i> | <i>Q.H.</i> |
|-------------------------------|-------------|
| Senior Seminar | 1 |
| Computer Science elective (5) | 4 |
| Subarea/general elective (9) | 4 |
| Subarea/general elective (10) | 4 |
| Subarea/general elective (11) | 4 |

Note: Two of the computer science electives must form a complete track as follows: database track—Database Management I and II; systems track—Operating Systems I and II; languages track—Compiler Design I and II.

■ Sample Five-Year Bachelor of Arts Program

(Computer Science Courses Starting in the First Year)

First Year

First Quarter

| <i>Course</i> | <i>Q.H.</i> |
|----------------------------------|-------------|
| Fundamentals of Computer Science | 4 |
| Computer Science Overview I | 1 |
| Calculus I | 4 |
| Freshman English I | 4 |
| Core (1) | 4 |

Second Quarter

| <i>Course</i> | <i>Q.H.</i> |
|--------------------------------|-------------|
| Algorithms and Data Structures | 4 |
| Computer Science Overview II | 1 |
| Calculus II | 4 |
| Discrete Mathematics I | 4 |
| Core (2) | 4 |

Third Quarter

| <i>Course</i> | <i>Q.H.</i> |
|-----------------------------------|-------------|
| Algorithms and Data Structures II | 4 |
| Calculus III | 4 |
| Freshman English II | 4 |
| General elective (1) | 4 |

Second Year

Fourth Quarter

| <i>Course</i> | <i>Q.H.</i> |
|---|-------------|
| Computer Organization and Programming I | 4 |
| General elective (2) | 4 |
| Science (3) | 4 |
| Core (4) | 4 |

Fifth Quarter

| <i>Course</i> | <i>Q.H.</i> |
|---|-------------|
| Automata and Formal Languages | 4 |
| Functional Programming and Applications | 4 |
| C Laboratory | 1 |
| Discrete Mathematics II | 4 |
| Science (2) | 4 |

Third Year

Sixth Quarter

| <i>Course</i> | <i>Q.H.</i> |
|------------------------|-------------|
| Analysis of Algorithms | 4 |
| Science (3) | 4 |
| Core (4) | 4 |
| General elective (2) | 4 |

Seventh Quarter

| <i>Course</i> | <i>Q.H.</i> |
|-----------------------------------|-------------|
| Analysis of Programming Languages | 4 |
| Middle-Year Writing Requirement | 4 |
| Core (5) | 4 |
| Core (5) | 4 |

Fourth Year

Eighth Quarter

| <i>Course</i> | <i>Q.H.</i> |
|--------------------------------|-------------|
| Computer Science elective (1) | 4 |
| Linear Algebra | 4 |
| Computers and Society (Core 7) | 4 |
| Core (8) | 4 |

Ninth Quarter

| <i>Course</i> | <i>Q.H.</i> |
|-------------------------------|-------------|
| Computer Science elective (2) | 4 |
| General elective (4) | 4 |
| Core (9) | 4 |
| Core (10) | 4 |

Fifth Year

Tenth Quarter

| <i>Course</i> | <i>Q.H.</i> |
|-------------------------------|-------------|
| Computer Science elective (3) | 4 |
| General elective (5) | 4 |
| General elective (6) | 4 |
| Core (11) | 4 |

Eleventh Quarter

| <i>Course</i> | <i>Q.H.</i> |
|-------------------------------|-------------|
| Senior Seminar | 1 |
| Computer Science elective (4) | 4 |
| General elective (7) | 4 |
| General elective (8) | 4 |
| Core (12) | 4 |

Four-Year Co-op Option

In this schedule, quarters with numbers represent quarters in school at Northeastern. Co-op and vacation quarters are so indicated.

| | Fall | Winter | Spring | Summer |
|-----------|-------|--------|--------|--------|
| Freshman | 1 | 2 | 3 | co-op |
| Sophomore | co-op | 4 | 5 | 6 |
| Junior | 7 | co-op | 8 | 9 |
| Senior | 10 | co-op | 11 | — |

■ Sample Four-Year Bachelor of Arts Program

First Year

| First Quarter | | Second Quarter | |
|-----------------------------------|------|----------------------------------|------|
| Course | Q.H. | Course | Q.H. |
| Fundamentals of Computer Science | 4 | Algorithms and Data Structures I | 4 |
| Computer Science Overview I | 1 | Computer Science Overview II | 1 |
| Calculus I | 4 | Calculus II | 4 |
| Freshman English I | 4 | Discrete Mathematics I | 4 |
| Core (1) | 4 | Core (2) | 4 |
| Third Quarter | | | |
| Course | Q.H. | | |
| Algorithms and Data Structures II | 4 | | |
| Calculus III | 4 | | |
| Freshman English II | 4 | | |
| General elective (1) | 4 | | |

Second Year

| Fourth Quarter | | Fifth Quarter | |
|---------------------------------------|------|---|------|
| Course | Q.H. | Course | Q.H. |
| Computer Organization and Programming | 4 | Automata and Formal Languages | 4 |
| Science (1) | 4 | Functional Programming and Applications | 4 |
| Core (3) | 4 | C Laboratory | 1 |
| Core (4) | 4 | Discrete Mathematics II | 4 |
| | | Science (2) | 4 |

Third Year

| Sixth Quarter | | Seventh Quarter | |
|----------------------------------|------|-------------------------------|------|
| Course | Q.H. | Course | Q.H. |
| Analysis of Algorithms | 4 | Analysis of Algorithms | 4 |
| General elective (2) | 4 | Linear Algebra | 4 |
| Core (5) | 4 | Computers and Society (7) | 4 |
| Core (6) | 4 | Science (3) | 4 |
| Eighth Quarter | | Ninth Quarter | |
| Course | Q.H. | Course | Q.H. |
| Computer Science elective (1) | 4 | Computer Science elective (2) | 4 |
| Middler-Year Writing Requirement | 4 | General elective (5) | 4 |
| General elective (3) | 4 | Core (9) | 4 |
| Core (8) | 4 | Core (10) | 4 |

Fourth Year

| Tenth Quarter | | Eleventh Quarter | |
|-------------------------------|------|-------------------------------|------|
| Course | Q.H. | Course | Q.H. |
| Computer Science elective (3) | 4 | Senior Seminar | 1 |
| General elective (5) | 4 | Computer Science elective (4) | 4 |
| General elective (6) | 4 | General elective (7) | 4 |
| Core (11) | 4 | General elective (8) | 4 |
| | | Core (12) | 4 |

■ Sample Four-Year Bachelor of Science Program

First Year

First Quarter

| <i>Course</i> | <i>Q.H.</i> |
|----------------------------------|-------------|
| Fundamentals of Computer Science | 4 |
| Computer Science Overview I | 1 |
| Calculus I | 4 |
| Freshman English I | 4 |
| Basic Social Science (1) | 4 |

Second Quarter

| <i>Course</i> | <i>Q.H.</i> |
|----------------------------------|-------------|
| Algorithms and Data Structures I | 4 |
| Computer Science Overview II | 1 |
| Calculus II | 4 |
| Discrete Mathematics I | 4 |
| Basic Social Science (2) | 4 |

Third Quarter

| <i>Course</i> | <i>Q.H.</i> |
|-----------------------------------|-------------|
| Algorithms and Data Structures II | 4 |
| FORTTRAN Laboratory | 1 |
| Calculus III | 4 |
| Freshman English II | 4 |
| Subarea/general elective (1) | 4 |

Second Year

Fourth Quarter

| <i>Course</i> | <i>Q.H.</i> |
|---|-------------|
| Computer Organization and Programming I | 4 |
| Calculus IV | 4 |
| Physics I | 4 |
| Physics Laboratory I | 1 |
| Subarea/general elective (2) | 4 |

Fifth Quarter

| <i>Course</i> | <i>Q.H.</i> |
|--|-------------|
| Computer Organization and Programming II | 4 |
| Discrete Mathematics II | 4 |
| Physics II | 4 |
| Physics Laboratory II | 1 |
| Subarea/general elective (3) | 4 |

Third Year

Sixth Quarter

| <i>Course</i> | <i>Q.H.</i> |
|-------------------------------|-------------|
| Automata and Formal Languages | 4 |
| C Laboratory | 1 |
| Probability | 4 |
| Subarea/general elective (4) | 4 |
| Subarea/general elective (5) | 4 |

Seventh Quarter

| <i>Course</i> | <i>Q.H.</i> |
|------------------------------|-------------|
| Systems Programming | 4 |
| Computer Engineering | 4 |
| Digital Systems Laboratory | 1 |
| Physics III | 4 |
| Subarea/general elective (6) | 4 |

Eighth Quarter

| <i>Course</i> | <i>Q.H.</i> |
|---|-------------|
| Functional Programming and Applications | 4 |
| Computer Science elective (1) | 4 |
| Technical Writing | 4 |
| Subarea/general elective (7) | 4 |

Ninth Quarter

| <i>Course</i> | <i>Q.H.</i> |
|-------------------------------|-------------|
| Software Design | 4 |
| Computer Science elective (2) | 4 |
| Linear Algebra | 4 |
| Subarea/general elective (8) | 4 |

Fourth Year

Tenth Quarter

| <i>Course</i> | <i>Q.H.</i> |
|-------------------------------|-------------|
| File Structures | 4 |
| Computer Science elective (3) | 4 |
| Computers and Society | 4 |
| Subarea/general elective (9) | 4 |

Eleventh Quarter

| <i>Course</i> | <i>Q.H.</i> |
|-------------------------------|-------------|
| Senior Seminar | 1 |
| Computer Science elective (4) | 4 |
| Computer Science elective (5) | 4 |
| Subarea/general elective (10) | 4 |
| Subarea/general elective (11) | 4 |

Note: Two of the computer science electives must form a complete track as follows: database track — Database Management I and II; systems track — Operating Systems I and II; languages track — Compiler Design I and II.

College of Criminal Justice



Norman Rosenblatt, Ph.D., *Dean*
Robert D. Croatti, A.B., *Associate Dean*
Robert E. Fuller, M.A., *Assistant Dean*
Lester W. McCullough, Jr., B.A., *Assistant Dean*

Professors

Edith E. Flynn, Ph.D.
James A. Fox, Ph.D.
George L. Kelling, Ph.D.
Nicole F. Rafter, Ph.D.

Associate Professors

John H. Laub, Ph.D.
Wallace W. Sherwood, LL.M.
Paul E. Tracy, Ph.D.

Assistant Professors

Allen J. Brown, D.Jur., Ph.D.
Susan Guarino-Ghezzi, Ph.D.
G. Roger Jarjoura, Ph.D.
Frank A. Schubert, D.Jur.

Degree Offered: Bachelor of Science

The College of Criminal Justice was founded to help prepare students for professions involved in some of the most important issues of our times. The college uses innovative methods and advanced scholarship to deal with these issues and to help prepare graduates for careers that are rewarding and beneficial.

As one of the few U.S. schools defining issues in criminal justice, the college has received substantial grants from the U.S. Department of Justice and has been designated a center of education and innovation in the field. In keeping with its national prominence, the college also serves as host institution for the George Lewis Ruffin Society, an organization of minority criminal justice professionals dedicated to expanding minority involvement and leadership in the criminal justice system through educational and outreach programs.

■ **Professional Preparation**

The college offers its students the opportunity to prepare for professional careers in the fields of criminal justice and private security; through its legal studies concentration, many students also prepare for entry to law school. The curriculum offers students a broad academic foundation upon which to base professional courses that introduce specific career areas. Legal studies, law enforcement, private security, corrections, probation and parole, juvenile delinquency, and planning and evaluation are some of the areas of interest pursued by students. Some graduates choose advanced study in such academic fields as criminology, planning and evaluation, social work, public administration, private security, and law, as well as in the entire area of criminal justice. The program is broad based and multi-disciplinary in order to prepare graduates to judge objectively the many problems inherent in the administration of justice in contemporary American society.

■ **Five-Year Cooperative Education Program**

The College of Criminal Justice five-year academic program allows a candidate for the baccalaureate degree to undertake a specialized program of study in one of four academic concentrations: security and crime prevention, law enforcement, corrections, and legal studies.

Co-op assignments may include work in parole or probation offices, law firms, police departments, private security agencies, public or private institutions, social and government agencies, prisons, planning and evaluation units, or other areas related to the criminal justice program.

Students are offered a broad and liberal educational background for future roles in criminal justice, private security, or law. Because students are preparing for careers involving the concerns and problems of people from all walks of life, course work in the social sciences, behavioral sciences, and humanities is integrated with professional courses. The liberal content of the curriculum is not only a foundation for general intellectual development, but also an indispensable educational requirement for professional development. Professional course offerings address serious issues of our time, including terrorism, organized crime, drug abuse, computer crime, industrial espionage, and prison overcrowding.

■ **Honors Program**

The College of Criminal Justice participates in the University Honors Program. See page 18.

■ **Graduation Requirements**

Candidates for the bachelor of science degree must complete all the prescribed work of the curriculum, a total of 172 quarter hours of credit.

Students are urged to undertake the Cooperative Plan of Education. In so doing, they must meet the requirements of the Department of Cooperative Education before they become eligible for their degrees.

■ **Graduation with Honors** See page 49.

■ **Transfer Credit**

No student transferring from another college or university is eligible to receive a degree until at least one year of academic work immediately preceding graduation has been completed at Northeastern.

■ **Sample Freshman-Year Program**

| First Quarter | Third Quarter |
|---|-------------------------------------|
| English | Administration of Criminal Justice |
| History | Foundations of Psychology II |
| Introduction to Law and the Legal Process | Introduction to American Government |
| Introduction to Sociology | History |
| Second Quarter | |
| Critical Issues in Criminal Justice | |
| English | |
| Foundations of Psychology I | |
| Introduction to Politics | |

Note: In addition to the above courses, students may choose to take Basic ROTC.

■ **Course Requirements**

| General | | | |
|--|------|---|------|
| Course | Q.H. | Course | Q.H. |
| Principles and Problems of Economics | 8 | Freshman English II* | 4 |
| Introduction to Politics* | 4 | State and Local Government ⁺ | 4 |
| Introduction to American Government* | 4 | History* | 8 |
| Foundations of Psychology I and II* | 8 | Science or Math ⁺ | 8 |
| Introduction to Sociology* | 4 | Middler-Year Writing Requirement | 4 |
| Freshman English I* | 4 | Non-Criminal Justice electives (12) | 48 |
| Professional | | | |
| Course | Q.H. | Course | Q.H. |
| Administration of Criminal Justice* | 4 | Introduction to Criminal Law ⁺ | 4 |
| Critical Issues in Criminal Justice | 4 | Criminal Due Process ⁺ | 4 |
| Introduction to Law and the Legal Process* | 4 | Criminal Justice Research | 4 |
| Criminology ⁺ | 4 | Criminal Justice electives (9) | 36 |

*These courses are usually taken in the freshman year.

⁺These courses are usually taken in the sophomore year.

■ **Graduate Education** For information on graduate degrees, see page 206.

College of Engineering



Paul H. King, Ph.D., *Dean*

Richard J. Murphy, Ph.D., *Associate Dean for Undergraduate Programs*

David R. Freeman, Ph.D., *Associate Dean and Director of the Graduate School*

Thomas E. Hulbert, M.S., P.E., *Associate Dean and Director of the School of
Engineering Technology*

Cynthia Snow, M.A., *Assistant Dean for Administration*

David C. Blackman, M.S., *Assistant Dean and Director of Minority Affairs*

Paula G. Leventman, Ph.D., *Assistant Dean and Director of Women in Engineering*

Candace A. Martel, M.Ed., *Director of Engineering Student Services*

The College of Engineering prepares its students to contribute to the accumulation and application of technological knowledge in a changing world. Fundamentals are emphasized; students have the opportunity to obtain the basic technical knowledge necessary to practice in a variety of professional positions.

■ Professional Preparation

The college recognizes that education is a lifelong process. It acknowledges and values study of the social sciences and humanities, for these provide an awareness of the social, economic, political, aesthetic, and philosophical influences that help shape the world in which students will practice their professions. The overall objectives of the College of Engineering are to help students to:

- understand the basic principles of a particular branch of engineering;
- develop and demonstrate competence in analysis and design appropriate to an engineering specialization;
- communicate effectively and reason clearly;
- acquire the motivation to continue professional growth.

■ Five-Year Cooperative Education Program

The College of Engineering offers cooperative education programs in chemical, civil, electrical, industrial, and mechanical engineering leading to the bachelor of science degree in a specified area. Also offered is a general engineering program leading to an unspecified bachelor of science degree. Through this program students may design a curriculum suited to their objectives. The various curricula offer students the opportunity to prepare effectively for employment in industry or for postgraduate study.

The freshman year is comprised of three quarters of full-time study. Courses in mathematics, physics, chemistry, and computers form the foundation upon which upperclass curricula are built. Beginning in the second year, students progress through sequential engineering science courses to advanced courses specific to their major. Advanced courses place a heavy emphasis on design. At least one-eighth of each curriculum is devoted to electives in the social sciences and humanities. All degrees have the additional requirement that the student demonstrate proficiency in communication.

Cooperative work in one's chosen branch of engineering begins upon completion of the freshman year and continues throughout the upperclass years, alternating with periods of full-time study. Cooperative education experiences help the student integrate engineering and the liberal arts and are instrumental in teaching the value of teamwork. The student acquires valuable insight into the problems of engineering practice.

■ Four-Year Co-op Option

Most students complete the program in five years with seven quarters of cooperative work. Four-year co-op options are available for students who prefer to complete the program in a shorter time. These options provide four quarters of cooperative work. Students indicate their preference for the four-year option in the winter quarter of the freshman year.

■ Honors Program

The College of Engineering participates in the University Honors Program. See page 18.

■ Graduation Requirements

The College of Engineering reserves the right to amend programs, courses, and degree requirements to fulfill its educational responsibility to respond to relevant change.

Candidates for the bachelor of science degree must complete all of the prescribed

work of the curriculum in which they seek to qualify, with no academic deficiencies in required course work.

Degree requirements are based upon the year of graduation, determined by the date of entry or re-entry into the College of Engineering. Degree requirements and the year of graduation for a degree candidate who fails to make normal academic progress for more than two quarters will be subject to review and possible change.

Students transferring from another college or university are not eligible to receive the bachelor of science degree until they have completed at least 48 quarter hours at Northeastern University immediately preceding their graduation.

- **Graduation with Honors** See page 49.

- **Five-Year Cooperative Education Bachelor of Science/Master of Science Joint Degree Program in Engineering**

The Departments of Electrical and Computer Engineering, Industrial Engineering and Information Systems, and Mechanical Engineering offer programs leading to both the bachelor's and master's degrees in five years. Degree candidates must maintain a 3.2 cumulative quality-point average, carry extra courses, and in the senior year forego one cooperative work quarter to complete the course requirements within five years.

- **Part-Time Evening Program**

This program—a six-year, part-time curriculum—leads to a degree of Bachelor of Science in Civil, Electrical, or Mechanical Engineering. Classes are held in the evening. Admission and course requirements are the same as for the full-time five-year cooperative degree programs. For more information, consult the evening brochure of the College of Engineering, available from Engineering Student Services, 220 Snell Engineering Center, Northeastern University, Boston, MA 02115, 617-437-2185.

- **Transfer Credit**

Credit is generally granted toward a Northeastern degree for any reasonably equivalent course with a C (2.0) or better grade from another accredited institution. Students requesting transfer credit must provide supporting documentation such as transcripts and course descriptions.

- **Student Services**

Engineering Student Services Office The Engineering Student Services Office provides academic support services for all undergraduate students in the College of Engineering. The office, located in 220 Snell Engineering Center, is the primary source of assistance for all full-time and part-time candidates for the B.S. degree. All upper-class student files are maintained in this office.

Minorities in Engineering Through the Northeastern University Progress in Minorities in Engineering (NUPRIME) program, the college seeks to expand educational opportunities for qualified Blacks, Puerto Ricans, Mexican-Americans, and Native Americans. It provides scholarships based on merit or need. Every effort is made to provide enough aid so that outside work is not necessary during the freshman year. Advising and tutorial services are among the support services provided by the program.

Women in Engineering More women are entering the field of engineering each year. Any woman with scientific or technical interests and aptitudes should consider the many advantages of an engineering education. Industry and government, now aware of this largely untapped pool, are eager to provide positions for qualified women engineers.

Approximately 400 undergraduate women are currently enrolled in the college. The Women in Engineering Program office maintains an interactive database for academic support and networking. An active chapter of the Society of Women Engineers offers a full schedule of technical, professional, and social programs.

■ Facilities

The college computer center supports course work and research activities at all levels. Freshmen in computer graphics and design courses have access to a Digital VAX 11/785 system with 32 student terminals; a Computervision Computer-Aided Design and Manufacturing (CAD/CAM) system with six advanced workstations; 15 UNIX workstations; and 65 IBM XTs, ATs, and Macintoshes in local area networks. The engineering departments provide a variety of mini- and microcomputer facilities for specialized course work and research. The University computer center provides access to a VAX 8650 and 170 networked IBM PCs.

■ Accreditation

All bachelor of science degree programs with specification, offered solely by the College of Engineering, are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET). Part-time evening programs are also accredited.

■ Sample Freshman-Year Program

The freshman-year program of studies in the College of Engineering is the same for all designated majors in the college.

First Quarter

Calculus
Computers for Engineers
English II
Physics
Physics Laboratory

Second Quarter

Calculus
Engineering Graphics and Design
General Chemistry
Physics
Physics Laboratory

Third Quarter

Calculus
General Chemistry
Great Themes in Literature
Laboratory elective
Physics

Note: In addition to the above courses, students may choose to take Basic ROTC.

■ Graduate Education For information on graduate degrees, see page 206.

Department of Chemical Engineering

Ralph A. Buonopane, Ph.D., *Associate Professor and Chairman*

Professors

John A. Williams, Ph.D.
Donald L. Wise, Ph.D.,
Cabot Corporation
Professor of Chemical
Engineering

Associate Professors

Bernard M. Goodwin, Sc.D.
Richard R. Stewart, Ph.D.
Ronald J. Willey, Ph.D.

Assistant Professor

Gilda A. Barabino, Ph.D.,
DiPietro Professor of
Chemical Engineering

Degree Offered: Bachelor of Science in Chemical Engineering

Chemical engineering involves the design, construction, operation, and management of processes in which materials essential to society are produced. The goal of the chemical engineer is to develop processes that use resources most efficiently, economically, and safely and in an environmentally sound manner.

Since the field of chemical engineering is so varied, the program has been designed to offer broad training which stresses fundamental principles and provides the strong background needed for ready acclimatization to graduate school or industry.

■ Professional Preparation

The chemical engineer has been defined as a "professional experienced in the design, construction, and operation of facilities in which materials undergo biological, chemical, and physical change." Chemical engineers seek ways to reduce the costs, increase the production, and improve the quality of existing products, as well as to develop new products. Chemical engineering has grown out of discoveries which have served as a foundation for a great many new industries whose production processes involve chemical as well as physical changes.

Petrochemicals, biomedicine, pharmaceuticals, agricultural chemicals, food processing, plastics and synthetic fibers, energy and synthetic fuels, and waste management require employees trained in chemistry as well as engineering. Many older industries, such as pulp and paper, metals and glass production, paints and coatings, textiles, and electroplating, also employ chemical engineers. Computerized process controls are being designed to improve the efficiency of older plants, and computer-aided design of new plants is becoming increasingly common.

■ Five-Year Cooperative Education Program

The essential background for chemical engineers is derived from the fundamental courses in chemistry, mathematics, and physics required of all engineering students. Students then go on to advanced courses that apply these fundamentals to the solution of engineering problems. These upperclass courses blend the latest mathematical and theoretical analyses with the practical aspects of the profession. Students are provided the opportunity to pursue specialized career interests.

■ Four-Year Co-op Option See page 141.

■ Facilities

Computers The Department of Chemical Engineering uses and maintains a wide variety of specialized proprietary software to complement course work and research. Programs, including several complete simulation/design packages, are available for course work from sophomore through senior years. A department computer facility for chemical engineering students maintains networked connections with the University VAX computers (785 and 8650) and with IBM personal computers, printers, and plotters. A CAD system is also available.

Laboratories The department has an undergraduate teaching laboratory with sophisticated real-world (pilot-scale) equipment that students operate to attain skills in experimental methods and communications necessary for professional practice. Department equipment for all unit operations experiments is designed to introduce the student to basic measurements used in chemical engineering processes with emphasis on temperature, pressure, and flow rate. Students are given comprehensive problems to solve experimentally in such areas as heat and mass transfer, kinetics, thermodynamics, and process dynamics. They are required to design and conduct experiments, reduce data using computers, and write reports. Modern data acquisition techniques are used in all experiments; state-of-the-art process sensors transmit data signals to computers and microprocessors for analysis or read out.

Some undergraduates are allowed to conduct research projects in department research laboratories currently devoted to modern catalytic materials, biotechnology, and computer process control.

■ Course Requirements

General

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|----------------------|-------------|-------------------------------------|-------------|
| English | 8 | Engineering Graphics and Design | 4 |
| General Chemistry | 8 | Computers for Engineers | 4 |
| Chemistry Laboratory | 1 | Mathematical Analysis | 4 |
| Physics | 12 | Economics | 4 |
| Physics Laboratory | 2 | Social Science/Humanities electives | 16 |
| Calculus | 20 | | |

Professional

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|-------------------------------------|-------------|--------------------------------|-------------|
| Technical Writing | 4 | Heat Transport | 4 |
| Organic Chemistry | 8 | Separation Processes | 4 |
| Physical Chemistry | 10 | Chemical Engineering Economics | 4 |
| Chemical Engineering Calculations | 8 | Process Control | 4 |
| Computation Laboratory | 2 | Process Design | 12 |
| Chemical Engineering Thermodynamics | 8 | Chemical Engineering electives | 12 |
| Experimental Methods | 8 | Advanced Chemistry elective | 4 |
| Chemical Engineering Kinetics | 4 | Engineering elective | 4 |
| Momentum Transport | 4 | | |

■ Technical Electives

The Department of Chemical Engineering offers a variety of senior-year technical electives. These courses allow students to coordinate elective choices to satisfy their personal career objectives. Students must consult departmental guidelines to ensure satisfaction of design requirements.

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|--|-------------|--|-------------|
| Kinetics of Polymer Processes | 4 | Biochemical Engineering | 4 |
| Mathematical Methods in Chemical Engineering | 4 | Catalysis | 4 |
| Mass Transfer Operations | 4 | Pollution Control in the Chemical Industries | 4 |
| Special Topics | 4 | Projects | 6 |

Required advanced chemistry and engineering electives are selected from approved courses offered by other departments.

Department of Civil Engineering

Mishac K. Yegian, Ph.D., *Professor and Chairman*

Professors

Reginald L. Amory, Ph.D.
Frederic C. Blanc, Ph.D.
John J. Cochrane, Ph.D.
Constantine J. Gregory, Ph.D.
Paul H. King, Ph.D.
Kenneth M. Leet, Sc.D.

Associate Professors

Peter G. Furth, Ph.D.
Robert L. Meserve, M.S.
John G. Schoon, Ph.D.
Richard J. Scranton, M.S.
Irvine W. Wei, Ph.D.

Assistant Professors

Dionisio Bernal, Ph.D.
Mark Evans, Ph.D.
Peter K. Hadley, Ph.D.

Fadi A. Karaa, Ph.D.

Daniel E. Medina, Ph.D.
Walid S. Najjar, Ph.D.
Ali Touran, Ph.D.
Chia-Ming Uang, Ph.D.
Albert T. C. Yeung, Ph.D.

Adjunct Professors

Walter E. Jaworski, Sc.D.
Sidney J. Wartel, J.D.

Degree Offered: Bachelor of Science in Civil Engineering

The Department of Civil Engineering enables students to acquire a fundamental, yet rigorous and flexible engineering education, an education that can weather inevitable changes within the field. A wide range of electives in the humanities, social sciences, and basic sciences encourages students to investigate areas outside their specific technical focus and to extend their personal interests and involvement.

■ Professional Preparation

Civil engineering is a profession in which a knowledge of the mathematical and physical sciences—gained by study, experience, and practice—is applied judiciously to materials and forces for the progressive well-being of humanity. Civil engineers improve and protect the environment; provide facilities for community living, industry, and transportation; and provide structures for human use. The buildings people live and work in, transportation systems, city and town services, water supplies—all reflect creative planning and application of engineering principles by civil engineers.

Civil engineers measure and map the earth's surface and use these maps to situate their projects. They design and supervise the construction of bridges, tunnels, buildings, dams, and aqueducts. They build supporting foundations for these and other structures. Civil engineers plan, design, construct, and maintain highways, railroads, canals, and airports. They regulate rivers and control floods; build docks, pipelines, seawalls; develop harbors; design and build plants and systems to bring pure water to homes and factories; design and build systems for sewage and refuse disposal; manage wetlands; and irrigate arid areas.

■ Five-Year Cooperative Education Program

The civil engineering curriculum is divided into academic quarters and cooperative work assignments. The work phase is designed to allow the student to gain insight into all types of activity normally confronted by the civil engineer. Thus, the well-motivated student can determine from these work experiences what further course work will be required to become a successful practicing civil engineer.

The curriculum is intended to offer a solid educational background for students preparing for a career in the planning, design, and construction of foundations and structures, transportation systems, and environmental systems.

The first years of the curriculum are, for the most part, devoted to the fundamentals of math, basic sciences, and engineering that comprise the foundation for later professional studies. The final years are devoted to a range of professional subjects, both required and elective. Guidance from a faculty adviser is available throughout the academic program.

- **Four-Year Co-op Option** See page 141.
- **Part-Time Evening Program** See page 142.
- **Student Professional Society**

Northeastern University's student chapter of the American Society of Civil Engineers offers a unique complement to Northeastern's classroom and co-op experience. During the past ten years, in addition to traditional activities—sponsoring a weekly professional lecture series and field trips to construction sites and constructed facilities—members have successfully completed several community-service projects valued at approximately a quarter of a million dollars.

Among institutions to benefit from this chapter's financing, planning, design, and construction talents are the Children's Museum of Boston, the Joseph P. Kennedy, Jr., Memorial Hospital for Children, the Salvation Army's Camp Wonderland, the Cotting School for the Handicapped, the Boston Children's Services Association, the Language and Cognitive Development Center, the Brookline Mental Health Clinic, and the Colonel Daniel Marr Boys and Girls Club of Dorchester.

In recognition of these efforts, our group has been designated the "single most outstanding" chapter in the nation and has received the Robert Ridgway Award of the American Society of Civil Engineers for an unprecedented nine years.

■ **Facilities**

Computers The Department of Civil Engineering complements course work and research with a variety of computer facilities, including a microcomputer facility. All systems are supported with sophisticated software packages with applications to all disciplines of civil engineering.

Laboratories The department laboratories provide state-of-the-art equipment for research and teaching in soil mechanics, materials, structures, transportation, water quality, hydraulics, air pollution, environmental chemistry, microbiology, and unit operations. In addition, there are special project laboratories and three controlled environment rooms. The laboratories contain sophisticated equipment, including atomic absorption spectrophotometers, a gas chromatograph, a total carbon analyzer, a shaker table, triaxial and consolidation equipment, and structural testing machines.

■ **Course Requirements**

General

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|---------------------------------|-------------|-------------------------------------|-------------|
| English | 8 | Chemistry | 8 |
| Calculus | 20 | Economics | 4 |
| Computers for Engineers | 4 | Mathematical Analysis | 4 |
| Engineering Graphics and Design | 4 | Social Science/Humanities electives | 16 |
| Physics | 16 | General elective | 4 |
| Physics Laboratory | 2 | FORTRAN Laboratory | 1 |

Professional

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|------------------------------|-------------|-----------------------------------|-------------|
| Technical Writing | 4 | Soil Mechanics (w/ lab) | 6 |
| Structural Mechanics | 8 | Applied Probability Theory | 4 |
| Fluid Mechanics | 4 | Steel Design I | 4 |
| Engineering Economy | 4 | Dynamics | 4 |
| Structural Analysis (w/ lab) | 6 | Materials (w/ lab) | 6 |
| Environmental Engineering I | 4 | Concrete Design I | 4 |
| Capstone Design Project | 4 | Engineering Measurements (w/ lab) | 6 |
| Computations Laboratory | 1 | Technical electives | 28 |

■ Technical Electives

The Department of Civil Engineering offers a variety of technical electives. These enable students to select courses to satisfy their career objectives.

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|--------------------------------|-------------|------------------------------------|-------------|
| Thermodynamics | 4 | Legal Aspects of Civil Engineering | 4 |
| Hydraulic Engineering | 4 | Civil Engineering Systems | 4 |
| Structural Mechanics III | 4 | Transportation Analysis | 4 |
| Structural Analysis II and III | 8 | Construction Management | 4 |
| Concrete Design II | 4 | Steel Design II | 4 |
| Geotechnology | 4 | Foundation Engineering | 4 |
| Environmental Engineering II | 4 | Electrical Engineering | 4 |
| Environmental and Hydraulics | | Air Pollution | 4 |
| Laboratory | 4 | Highway Engineering | 4 |

Selected courses must include a combined total of 11 or more engineering design credits as specified by the department's design elective credit list.

Department of Electrical and Computer Engineering

John G. Proakis, Ph.D., *Professor and Chairman, William Lincoln Smith Chair*

Professors

Chung Chan, Ph.D.
 Anthony J. Devaney, Ph.D.
 James M. Feldman, Ph.D.
 Arvin Grabel, Sc.D.
 Jack I. Hanania, Ph.D.
 Sarma S. Mulukutla, Ph.D.
 Chrysostomos Nikias, Ph.D.
 Harold R. Raemer, Ph.D.,
*George A. Snell Professor
 of Engineering*
 Wilfred Remillard, Ph.D.
 J. Spencer Rochefort, M.S.
 Sheldon S. Sandler, Ph.D.
 Martin E. Schetzen, Sc.D.
 Walter C. Schwab, Ph.D.
 Philip E. Serafim, Sc.D.
 Michael B. Silevitch, Ph.D.
 Robert D. Stuart, Ph.D.
 Carmine Vittoria, Ph.D.

Associate Professors

Soeren Buus, Ph.D.
 J. Duncan Glover, Ph.D.
 Sheila Hinchey, Ph.D.
 Vinay Ingle, Ph.D.
 Wayne G. Kellner, Sc.D.
 Hanoch Lev-Ari, Ph.D.
 Stephen W. McKnight, Ph.D.
 Robert N. Martin, M.S.
 Lazaros Merakos, Ph.D.
 Charles T. Retter, Ph.D.
 Bahram Shafai, Sc.D.
 Paul M. Zavracky, Ph.D.

Assistant Professors
 David Brady, Ph.D.
 Jill D. Crisman, Ph.D.
 Clas A. Jacobson, Ph.D.
 Leonard E. Kay, Ph.D.
 Nam Chung Li, Ph.D.
 Anthony B. Maddox, Ph.D.

Elias S. Manolakos, Ph.D.
 Nicol E. McGruer, Ph.D.
 David J. McLaughlin, Ph.D.
 Chu Whan Moon, Ph.D.
 Zainalabedin Navabi, Ph.D.
 Ramachandran Raghavan,
 Ph.D.
 Carey M. Rappaport, Sc.D.
 Masoud Salehi, Ph.D.
 Charles Surya, Ph.D.
 Gilead Tadmor, Ph.D.
 Man-Kuan Vai, Ph.D.
 Kimon Valavanis, Ph.D.

Lecturers

William J. Bintz, M.S.
 Glenn R. Hearn, M.S.E.E.

Degree Offered: Bachelor of Science in Electrical Engineering

Among their many achievements, electrical engineers have been primarily responsible for the development of the computer, integrated circuits, the pacemaker, satellite communication, space navigation, microprocessors, television, and the means of providing energy. Electrical engineers are working to help find solutions to the problems of information transfer and management, industrial productivity, energy conservation and alternative energy sources, transportation, and health care.

■ Professional Preparation

Diverse in its applications, electrical engineering may still be divided into two broad areas: information sciences and energy resources. No rigid boundary exists between these two areas, and many technical specialties within electrical engineering are applicable to both. Information sciences are concerned primarily with systems whose function is computation, communication, or control. Included in this area

are the circuits and devices that comprise such systems and the application of the systems and engineering techniques to other disciplines. The energy resources area deals with problems related to the sources, generation, and distribution of large quantities of electrical energy.

Many electrical engineers are involved with the more traditional activities of system design and development, such as the information sciences or energy resources areas. Other electrical engineering graduates apply their skills to such disciplines as ocean exploration, meteorology, experimental psychology, electronic music, health-care systems, bioelectronics, and educational devices for the disadvantaged.

The outlook for employment in electrical engineering is optimistic. Electrical engineers have much to contribute to addressing many modern social problems: industrial productivity, the energy crisis, data transmittal and management, urban transportation, health care, and the plight of the socially and physically disadvantaged. The solution of all these problems requires judicious use of electrical energy, data processing electronic instrumentation and control, and electronic communication.

■ **Five-Year Cooperative Education Program**

The purpose of the program is to offer students an education that has the breadth and depth necessary for professional practice. To achieve this, the curriculum is divided into the core program and elective courses.

The core program includes those courses with content applicable to all specialties in electrical engineering. Subject areas covered in the core program include circuits and systems, digital computer design, electrical measurements (laboratories), electromagnetics, electronic devices and circuits, and energy conversion.

Elective courses permit development of individual interests. Many students use this part of the program to learn a particular subject in depth and to prepare for graduate studies. A broad range of courses is offered, including Digital Computer Architecture, Software Engineering, Communication Systems, Control Systems, Advanced Electronics, Solid-State Devices, Power Systems, Wave Propagation and Distributed Circuits, VLSI Design, Digital Signal Processing, Integrated Circuit Fabrication, and Mathematical Techniques.

In addition, students who wish to conduct individual projects or learn about a subject area not offered in an elective course may enroll in Senior Project and work one-on-one with an interested faculty adviser.

■ **Option in Computer Engineering**

The option in computer engineering is for electrical engineering students who wish to specialize in the design of digital computers and their integration within larger systems for communications, resource management, and automatic control.

In the design of a digital processing system, hardware and software must be considered an integrated entity—software cannot be separated from hardware. The computer engineer must be both a capable programmer and a capable hardware designer. The collective demands of computer engineering and traditional electrical engineering encompass more knowledge than can be included in a single highly structured degree program. The undergraduate option of the Department of Electrical and Computer Engineering meets these collective demands. Its objective is to provide the student with a basic but comprehensive knowledge of the principles underlying the organization, design, and applications of digital processing systems. The option therefore encompasses both hardware and software design and promotes an understanding of the important relationships and trade-offs between the hardware and software components of digital systems. Such understanding is necessary to create computer systems that satisfy users' needs at affordable prices.

■ **Option in Power Systems Engineering**

The Power Systems Engineering Program is an option for electrical engineering students who wish to specialize in energy resources. This program is conducted in cooperation with electric power companies in New England and several eastern states.

■ **Four-Year Co-op Option** See page 141.

■ **Five-Year Cooperative Education Bachelor of Science/Master of Science Joint Degree Program in Engineering** See page 142.

■ **Part-Time Evening Program** See page 142.

■ **Facilities**

Laboratory courses supplement concepts developed in core courses and introduce students to design and experimental techniques. Such courses are offered in circuits, electronics, electromagnetics, discrete systems, power systems, VLSI design, digital signal processing, control systems, and semiconductor device processing.

The department has laboratory equipment worth more than \$4.5 million. Facilities include standard and specialized laboratories, a PC laboratory, CRT terminals, and microprocessors. Programming courses and research programs also use the large computer systems of the College of Engineering and the University.

■ **Course Requirements**

General

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|--------------------|-------------|-------------------------------------|-------------|
| Calculus | 16 | Computers for Engineers | 4 |
| Physics | 16 | Engineering Graphics and Design | 4 |
| Physics Laboratory | 2 | Mathematical Analysis | 4 |
| General Chemistry | 8 | FORTTRAN Laboratory | 1 |
| English | 8 | Social Science/Humanities electives | 20 |

Professional

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|--|-------------|------------------------------|-------------|
| Technical Writing | 4 | Electronic Design I | 4 |
| Circuits and Systems I, II, and III | 12 | Field Theory I and II | 8 |
| Linear Systems Analysis I and II | 8 | Fields and Energy Conversion | 4 |
| Thermodynamics <i>or</i> Materials Science | 4 | Probability | 4 |
| Mechanics | 4 | Communication Systems | 4 |
| Electrical Engineering Laboratory | 9 | Computer Engineering | 12 |
| Electronics I and II | 8 | Technical electives | 20 |

■ Technical Electives

The Department of Electrical and Computer Engineering offers a wide variety of technical electives designed to satisfy individual objectives. Students must consult departmental guidelines to ensure satisfaction of design requirements. These electives are grouped below by discipline.

Electronic Circuits and Systems

Communication Theory
Control Systems
Electronic Design II
Numerical Methods and Computer Applications
Physical Electronics
Power Electronics
Semiconductor Devices and Technology
Senior Project Laboratories
Topics in Integrated Circuit Design

Electromagnetic Theory

Advanced Topics in Electromagnetic Field Theory
Numerical Methods and Computer Applications
Optics of Photon Devices
Semiconductor Devices and Technology
Senior Project Laboratories
Wave Transmission and Reception

Computer Engineering

Applied Discrete Analysis
Computer Engineering
Control Systems
Digital Signal Processing
Electronic Design II
Numerical Methods and Computer Applications
Senior Project Laboratories
Topics in Integrated Circuit Design

Systems Theory

Control Systems
Digital Signal Processing
Numerical Methods and Computer Applications
Power Systems I and II
Senior Project Laboratories
Wave Transmission and Reception

■ Computer Engineering Option Course Requirements

General

Same as general requirements on page 150.

Professional

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|-------------------------------------|-------------|-------------------------------------|-------------|
| Technical Writing | 4 | Computer Engineering I–IV | 16 |
| Circuits and Systems I, II, and III | 12 | Field Theory I and II | 8 |
| Linear Systems I and II | 8 | Fields and Energy Conversion | 4 |
| Electronics I and II | 8 | Communication Systems | 4 |
| Electronic Design I | 4 | Topics in Integrated Circuit Design | 4 |
| Thermodynamics or Materials Science | 4 | Probability | 4 |
| Mechanics | 4 | Technical electives | 12 |
| Electrical Engineering Laboratory | 11 | | |

■ Power Systems Option Course Requirements

General

Same as general requirements on page 150.

Professional

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|-------------------------------------|-------------|---|-------------|
| Technical Writing | 4 | Mechanics | 4 |
| Circuits and Systems I, II, and III | 12 | Electric Machines | 4 |
| Linear Systems I and II | 8 | Electric Power Systems | 8 |
| Thermodynamics | 4 | Electrical Engineering Power Laboratory | 3 |
| Electrical Engineering Laboratory | 9 | Electronic Design | 4 |
| Electronics I and II | 8 | Computer Engineering | 8 |
| Field Theory I and II | 8 | Probability | 4 |
| Fields and Energy Conversions | 4 | Technical electives | 8 |
| Power Electronics | 4 | | |
| Transients in Power Systems | 4 | | |

Department of Industrial Engineering and Information Systems

Stuart Jay Deutsch, Ph.D., *Professor and Chairman*

Professors

Thomas P. Cullinane, Ph.D.
David R. Freeman, Ph.D.
Carolyn D. Heising, Ph.D.
Ronald R. Mourant, Ph.D.
Wilfred P. Rule, M.S.

Associate Professors

Nasser Fard, Ph.D.

Surendra M. Gupta, Ph.D.

Thomas E. Hulbert, M.S.
Mieczyslaw M. Kokar, Ph.D.
Emanuel S. Melachrinoudis,
Ph.D.
Ronald F. Perry, Ph.D.
Gerard Volland, Ph.D.

Assistant Professors

M. Louis Brennan, Ph.D.
Jason Kim, Ph.D.
Anthony B. Maddox, Ph.D.
Mark Staknis, Ph.D.

Lecturer

Richard H. Pike, M.B.A.

Degree Offered: Bachelor of Science in Industrial Engineering

Industrial engineers are problem solvers. Industrial managers need factual information that defines the consequences of alternative decisions. The industrial engineer collects this information and evaluates alternatives to make decisions that best advance particular organizational goals. The scope of decisions may involve the entire organization or some portion of it associated with a given product or service.

■ Professional Preparation

As a problem solver, the industrial engineer is concerned with complex human-machine systems that require a knowledge of engineering fundamentals. Since industrial engineers are often employed as managers, our students are instructed in economics, statistics, operations research, and corporate organization so they can make informed managerial decisions. In addition, they are made aware of the relationship between human needs and the work environment through courses in work analysis, human factors, and manufacturing systems.

■ Five-Year Cooperative Education Program

The program of study offered by the Department of Industrial Engineering and Information Systems emphasizes current developments in industrial engineering: computer/information and industrial/manufacturing systems. Computer-based applications are an integral part of most courses, including Probability and Statistics, Operations Research, Simulation, Engineering Economy, and Work Design. Students gain hands-on experience with microprocessors and automated manufacturing.

■ Four-Year Co-op Option See page 141.

■ Five-Year Cooperative Education Bachelor of Science/Master of Science Joint Degree Program in Engineering See page 142.

■ Facilities

Artificial Intelligence Laboratory This facility is equipped with Xerox artificial intelligence (AI) machines for programming expert systems and AI applications.

Computer Laboratory Numerous microcomputers allow students to apply software to engineering problems. The department has a large collection of industrial engineering software available for student use.

Manufacturing and Robotics Laboratory Students simulate an automated factory with the use of a master minicomputer, programmable microprocessors, a robot, and a conveyor belt integrated for manufacturing system experimentation.

Microprocessor Laboratory This laboratory has microprocessors for hands-on machine programming and microprocessor networking. Two local area networks of 16-bit microprocessors allow students to perform a variety of communication experiments.

■ **Course Requirements**

General

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|---------------------------------|-------------|--------------------------------------|-------------|
| Calculus | 20 | Computers for Engineers | 4 |
| Physics | 16 | Economics I and II | 8 |
| Physics Laboratory | 2 | Mathematical Analysis | 4 |
| General Chemistry | 8 | Social Science/Humanities/Behavioral | |
| English | 8 | Science electives | 16 |
| Engineering Graphics and Design | 4 | Open elective | 4 |

Professional

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|----------------------------------|-------------|-------------------------------------|-------------|
| Applied Engineering Software | 1 | Simulation | 4 |
| Technical Writing | 4 | People and Organizations | 4 |
| Work Design | 4 | Principles of Computation | |
| Statics | 4 | and Programming I | 4 |
| Electrical Engineering I | 4 | Engineering Economy and Statistical | |
| Probabilistic Analysis | 4 | Decision Theory | 4 |
| Statistics I and II | 8 | Engineering Science electives | 8 |
| Production and Inventory Control | 4 | Technical electives | 16 |
| Operations Research I and II | 8 | Design project | 4 |
| Systems I | 4 | | |

■ **Engineering Science Electives**

Dynamics I
 Fluid Mechanics
 Materials Science
 Structural Mechanics II
 Structural Analysis I
 Thermodynamics I

■ **Technical Electives**

The Department of Industrial Engineering and Information Systems offers a wide variety of technical electives. These enable students to coordinate elective choices to satisfy their personal objectives. Students must consult departmental guidelines to ensure satisfaction of design requirements.

Expert Systems in Engineering
 Facilities Design
 Human Considerations in Engineering Design
 Human Factors
 Management Information Systems
 Manufacturing Automation
 Material Handling System Design
 Microprocessor Applications
 Statistical Quality Control

Department of Mechanical Engineering

Yaman Yener, Ph.D., *Professor and Acting Chairman*

Professors

George G. Adams, Ph.D.
Charles A. Berg, Sc.D.
John W. Cipolla, Jr., Ph.D.
John F. Dunn, Sc.D.
Alexander M. Gorlov, Ph.D.
Richard J. Murphy, Ph.D.
Welville B. Nowak, Ph.D.,
*Smith Professor of
Engineering*
John N. Rossettos, Ph.D.
John Zotos, Met. Engr.

Associate Professors

Joseph T. Blucher, Ph.D.
Gregory I. Kowalski, Ph.D.
Bertram S. Long, M.Engr.
Mohamad Metghalchi, Ph.D.
Uichiro Narusawa, Ph.D.
Hamid Nayeb-Hashemi, Ph.D.
Mohammad E. Taslim, Ph.D.
Alvin J. Yorra, M.S.
Ibrahim Zeid, Ph.D.

Assistant Professors

Yiannis A. Levendis, Ph.D.
Andrew V. Tangborn, Ph.D.
Mary Grace Williams, Ph.D.

Lecturers

Giudo Lopez, M.S.
Masoud Olia, M.S.

Professors Emeriti

Ralph S. Blanchard, M.S.
Arthur R. Foster, M.Engr.

Degree Offered: Bachelor of Science in Mechanical Engineering

Mechanical engineering is that branch of science broadly concerned with energy: with its transformation from one form to another, its transmission, and its utilization. Mechanical engineers conceive, plan, design, and direct the manufacture, distribution, and operation of a myriad of devices, machines, and systems—including complex human-machine systems—for energy conversion, environmental control, materials processing, transportation, materials handling, prosthetics, manufacturing, and the field of consumer products.

■ Professional Preparation

The rapid technological advances of the past four decades have considerably expanded the mechanical engineer's sphere of inquiry and influence, bringing the engineer into contact with such diverse disciplines as nuclear and solid-state physics, quantum mechanics, plasma physics, chemical kinetics, magnetohydrodynamics, and rarefied gas dynamics, to name a few.

Mechanical engineers are engaged in all the engineering functions, including creative design, applied research, development, production, and management. The field of mechanical engineering is broad, providing an excellent professional base for interdisciplinary activities and career choice.

■ Five-Year Cooperative Education Program

In the first years, students have the opportunity to learn essentials of the basic sciences (mathematics, physics, and chemistry), the engineering sciences (mechanics, thermodynamics, fluid mechanics, and materials science), and the humanities. Senior students may choose to concentrate in the areas of thermofluids engineering, mechanics and design, or materials science and engineering.

Thermofluids engineering is concerned with the properties and characteristics of the working fluids of machines. For example, the ability of an aircraft to fly depends upon the manner in which air flows over its lifting surfaces. The energy to run a turbine is extracted from the steam or combustion gases that pass through it. The engineer must have a knowledge and understanding of the concepts of thermodynamics. The efficiency of a cooling tower depends on the mechanisms by which fluids transfer heat to surfaces, so the engineer must have a firm grasp of the principles of heat transfer.

Mechanics and design are based on the fundamental scientific and mathematical tools used in the analysis of mechanical configurations as they evolve in the design

of machines and power-producing devices. For example, the mechanics and design engineer may analyze and design structural components for power plants and deep-sea oceanographic vessels or develop new methods for evaluating filamentary composite structures. In the machine-tool industry, engineers may be concerned with computer control of machine tools. In the engine industry, they may analyze stresses in components such as turbine blades. To prepare for such challenges, senior students may expand their basic knowledge by selecting such courses as Intermediate Strength of Materials, Systems Analysis and Control, and Computer-Aided Design.

Materials science and engineering is concerned with relationships among the structure, composition, properties, and functions of materials and with control of the structure and composition to achieve desired properties. Only recently have engineers come to realize that an understanding of the principles of materials science enables them to design more creatively and with greater freedom than does traditional reference to handbooks. Examples of areas in which the properties of materials are a part of the basic design function include manufacturing techniques, structures (vehicles, buildings), energy conversion, electronic devices (including computers), packaging, and prosthetic devices. Advanced courses are available for mechanical engineers desiring further knowledge in the materials field.

- **Four-Year Co-op Option** See page 141.
- **Five-Year Cooperative Education Bachelor of Science/Master of Science Joint Degree Program in Engineering** See page 142.
- **Part-Time Evening Program** See page 142.
- **Facilities**

Computers The department has a laboratory for computer-aided design (CAD) equipped with five Computervision workstations, printers, and plotters. The CAD laboratory is also supported by the engineering college computer center, which provides students and faculty access to an extensive library of mechanics codes and other related software for design. In addition, the department has a computerized numerical control (CNC) milling machine for producing parts designed at the workstations.

Laboratories The extensive laboratories of the Department of Mechanical Engineering fully support the teaching of the department as well as basic research in the three principal disciplines of the field: thermodynamics and fluid mechanics (thermofluids), mechanics of solids, and materials.

The thermofluids laboratories comprise an experimental internal combustion lab, a subsonic wind tunnel, a laser doppler (dual axis) velocimeter, and a variety of associated computer equipment and instrumentation for experimental research in combustion, heat transfer, and turbulent flow. These laboratories support an active program of solar energy research. Heat transfer research includes examination of interactions of coherent (laser) radiation with textile surfaces.

The solid mechanics laboratories are equipped to support research in structural dynamics and vibrations and in the physical behavior of structural materials, including fracture, fatigue, and wear. These laboratories include two dynamic mechanical programmable shakers with accelerometers and other instrumentation. Equipment for research in the behavior of materials includes two Systems Corporation MTS programmable testing machines and several machines for experiments in tension, torsion, and fatigue loading.

The laboratory for materials research includes electron microscopes, thin-film laboratories, equipment for the preparation of metallurgical specimens, furnaces for processing experiments, and a powdered metal production plant. This laboratory now supports experimental research in properties of films, microstructure of materials, and other studies related to engineering applications of materials. Other departmental resources include a fully equipped machine shop and a shop for electronics and instrumentation.

■ **Course Requirements**

General

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|---------------------------------|-------------|-------------------------------------|-------------|
| English | 8 | Physics | 12 |
| General Chemistry | 8 | Physics Laboratory | 2 |
| Computers for Engineers | 4 | Mathematical Analysis | 8 |
| Engineering Graphics and Design | 4 | Physics/Science elective | 4 |
| Calculus | 20 | Social Science/Humanities electives | 16 |
| Key Ideas in Engineering | 1 | Economics | 4 |

Professional

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|--------------------------------|-------------|------------------------|-------------|
| Writing Workshop | 1 | Fluid Mechanics | 5 |
| Statics | 5 | Materials Science | 5 |
| Dynamics I and II | 9 | Design | 20 |
| Strength of Materials I and II | 9 | Electrical Engineering | 4 |
| Thermodynamics I, II, and III | 15 | Technical electives | 16 |
| Heat Transfer | 5 | Vibrations | 5 |
| Measurement and Analysis | 5 | | |

■ **Technical and Design Electives**

The four elective courses may be chosen from among the courses listed below. A course from outside the department may be substituted for one elective. Students must consult departmental guidelines to ensure satisfaction of design requirements.

| | |
|------------------------------------|--|
| Aspects of Forensic Design | Internal Combustion Engines |
| Computer-Aided Design I and II | Introduction to Combustion |
| Design for Space Applications | Materials Processing |
| Engineering Materials | Mechanical Behavior of Materials |
| Fluid Mechanics II | Mechanical Engineering Honors Projects |
| Gas Dynamics | System Analysis and Control |
| Intermediate Strength of Materials | |

Program in Biomedical Engineering

Samuel Fine, S.M., M.D., *Professor and Director*

Associate Professor

H. Frederick Bowman, Ph.D.

Degree Offered: Bachelor of Science (in one of the engineering disciplines)

Biomedical engineering sees problems of biological and medical significance as tasks to be resolved through analysis, design, invention, and manufacturing.

■ **Professional Preparation**

Biomedical engineers are engaged in both theoretical and experimental studies, either as independent investigators or as members of a research or development group. Their work is far-ranging. They may characterize and determine the

mechanism of action of natural and synthetic macromolecules, analyze the properties of blood, and/or investigate the structure and function of such organ systems as the nervous system, the respiratory system, the cardiovascular system, or the endocrine system. They may design, develop, market, and apply transducers, cardiac pacemakers and defibrillators, heart-assist systems, artificial kidneys and limbs, or diagnostic and therapeutic X-ray and imaging systems. They are important members of the hospital health team.

A biomedical engineering degree can provide a sound foundation for a doctorate in medicine or dentistry, a career in biomedical engineering or biotechnology, or a career as an engineer in a hospital or a government agency such as the U.S. Department of Health and Human Services.

Opportunities in these rapidly expanding fields are, of course, dependent upon such factors as the state of the economy and the student's own industry and overall ability. Industrial organizations, particularly those in the health-care industry, may be seeking individuals with a strong background in engineering supplemented by a biological science education. Other career opportunities may include public health, the psychological sciences, and the marine sciences.

■ **Five-Year Cooperative Education Program**

The purpose of the Program in Biomedical Engineering is to help undergraduate students at all levels choose courses in the biological sciences that complement the standard engineering curriculum. There is, therefore, no special curriculum in biomedical engineering. Several engineering disciplines help provide the degree candidate with a technical background sufficient for a career in this field.

A degree in an engineering discipline is chosen in consultation with the biomedical engineering adviser. A biology minor in conjunction with the specific engineering discipline may also be arranged. Life science courses may be taken either as part of an engineering degree or as additional courses. In the first year, engineering graphics and design can be replaced by a biology course for biomedical students. The opportunity to take these courses is dependent on the student's interests, capabilities, and academic record.

Students who wish to take an engineering program that includes biological sciences must contact the director of biomedical engineering immediately on arrival at the University so that a proper freshman-year schedule can be arranged.

■ **Four-Year Co-op Option** See page 141.

General Engineering Program

Advisory Committee for 1990–1991

Richard R. Stewart, Ph.D., *Chemical Engineering, Chairman*

Arvin Grabel, Sc.D., *Electrical Engineering*

Ronald F. Perry, Ph.D., *Industrial Engineering*

Richard J. Scranton, M.S., *Civil Engineering*

Alvin Yorra, M.S., *Mechanical Engineering*

Degree Offered: Bachelor of Science

Engineering and technology influence virtually all areas of endeavor and have a profound effect on the lifestyle and institutions of society. Their impact is both cultural and scientific and is manifested by the awareness that solutions to society's problems are, in part, technological. The program's goal is to provide flexible,

interdisciplinary educational opportunities based on fundamental engineering concepts. The work performed by graduates of this program is expected to encompass the entire spectrum of professional activity, including computers, urban technology, social systems, and health care.

■ **Professional Preparation**

Students completing an adviser-approved program receive an unspecified bachelor of science degree from the College of Engineering. The program is designed for students whose interests are in engineering-related professions rather than in traditional engineering. It is highly elective and gives students the opportunity to tailor a program that meets particular career objectives. Students are exposed to engineering fundamentals through courses in electric circuits, systems, mechanics, thermodynamics, and materials. These courses are based on principles developed in early courses in mathematics and physics. Each student is also required to learn the elements of computer programming.

Graduate education and continuing education are increasingly important in professional life. Appropriate planning enhances one's chance for admission to various graduate and professional schools, including law, medicine, public health, and social sciences as well as engineering.

■ **Five-Year Cooperative Education Program**

Students in the program are required to satisfy the following minimum requirements.

■ **Course Requirements**

General

| <i>Course</i> | <i>Q.H.</i> |
|---------------------------------|-------------|
| Calculus | 16 |
| Computers for Engineers | 4 |
| Engineering Graphics and Design | 4 |
| English | 8 |
| Humanities electives | 8 |
| Physics | 12 |
| Physics Laboratory | 2 |
| Social Science electives | 16 |

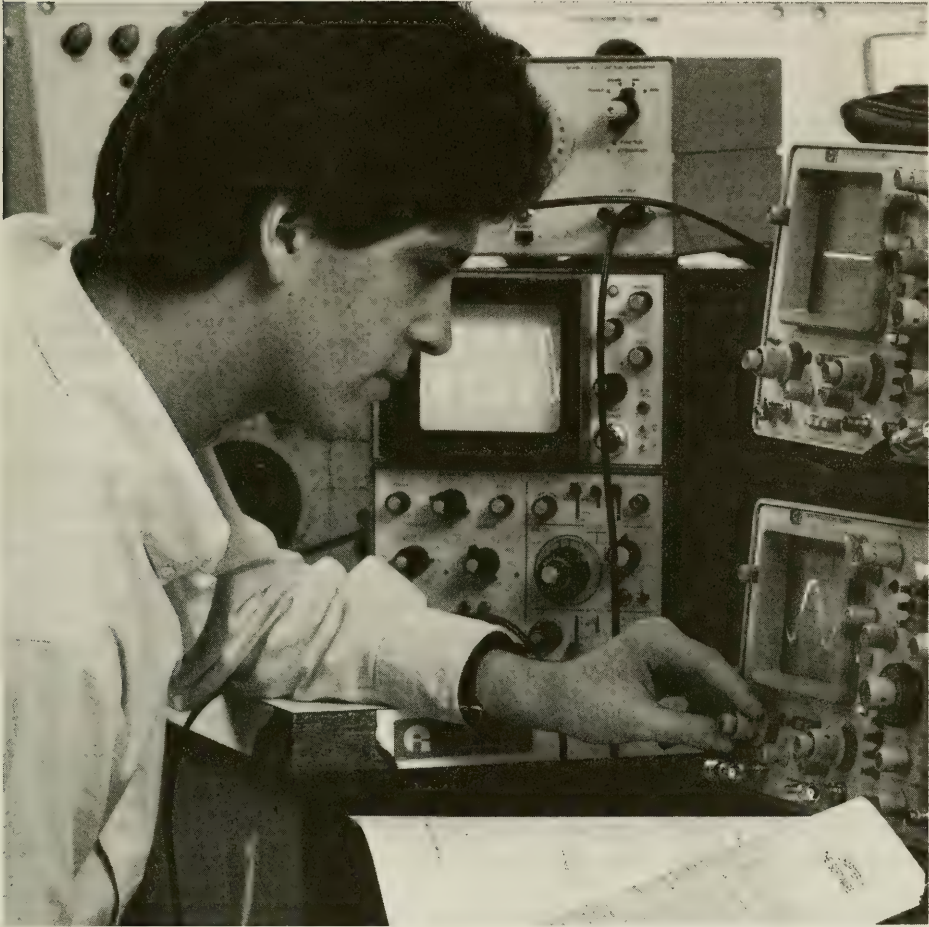
Professional

| <i>Course</i> | <i>Q.H.</i> |
|------------------|-------------|
| Circuit Theory | 4 |
| Materials | 4 |
| Systems Analysis | 4 |
| Thermodynamics | 5 |

The remaining portion of the program is completely elective but must fit the student's career objectives. At least 24 quarter hours of course work must be taken in the professional departments of the College of Engineering (chemical, civil, electrical and computer, industrial and information systems, and mechanical engineering). Beyond the freshman year, students plan their programs in conjunction with a faculty adviser.

■ **Four-Year Co-op Option** See page 141.

School of Engineering Technology



Thomas E. Hulbert, M.S., P.E., *Director and Associate Dean of Engineering*

Roy Dalsheim, B.S., *Assistant Director*

Rasma Galins, *Assistant Director*

John Kaczorowski, M.S., *Assistant Director*

Rosanne L. Bogan, B.S., *Staff Assistant*

Professors

Thomas E. Phalen, M.S., P.E.,
*Mechanical Engineering
Technology*

Ronald E. Scott, Sc.D., P.E.,
*Electrical Engineering
Technology*

Associate Professors

David S. Goldman, M.S., P.E.,
Computer Technology

Eric W. Hansberry, M.S.,

Design Graphics

George F. Kent, M.S., P.E.,
*Mechanical Engineering
Technology (Visiting)*

Nonna K. Lehmkuhl, M.Ed., M.S.,
Computer Technology

Ernest E. Mills, M.S., P.E.,
*Mechanical Engineering
Technology*

Assistant Professors

David Allen, M.S.

Robert B. Angus, M.S., P.E.,
*Electrical Engineering
Technology*

John E. Hajjar, Ph.D.,
Computer Technology

Frederick J. Nohmer, Ed.D.,
*Electrical Engineering
Technology*

The engineering technologist works with the professional engineer, scientist, medical doctor, supervisor, and craftsman to develop techniques for converting scientific knowledge and craftsmanship into products. The programs offered by the School of Engineering Technology, therefore, concentrate on the applications of technology. Emphasis is placed on the rational processes involved in converting theories and ideas into practical techniques, procedures, and products. Fundamentals are related to current practice, providing a supportive “why” for the practical “how.” Study of the humanities and social sciences help give students a balanced awareness of the real world.

■ Professional Preparation

The engineering technology curriculum is based on the need for relevant technical skills and a foundation for future growth. Engineering technology education seeks to help students to:

- understand the scientific principles that govern the current technology of the particular branch of engineering that they select;
- apply technology to problem solving;
- communicate effectively the important implications of technological advances;
- acquire the motivation for continued development of technical skills.

■ Five-Year Cooperative Education Programs

The school offers cooperative education programs in mechanical engineering technology, electrical engineering technology, and computer technology—all leading to the degree of Bachelor of Engineering Technology.

Since the freshman year of study is similar for electrical and mechanical engineering technology students, a firm choice of major may be delayed until the spring, when the choice of cooperative work assignments makes a decision mandatory. Students who choose to major in computer technology should decide on this major during the first quarter of their freshman year. About four-fifths of the upperclass program is devoted to scientific and technological study and about one-fifth to humanities-social science courses, to balance technical proficiency with an appreciation of the nontechnical aspects of society and culture. Cooperative education experiences during the upperclass years are most valuable in helping students to integrate the important elements of both a technical and a liberal education.

■ Honors Program

The School of Engineering Technology participates in the University Honors Program. See page 18.

■ Graduation Requirements

Candidates for the Bachelor of Engineering Technology degree must complete all of the prescribed work of the curriculum in which they seek to qualify. A total of approximately 189 quarter hours is required for the degree. Students who undertake the cooperative education program must meet the requirements of the Department of Cooperative Education before they become eligible for their degrees.

Students transferring from another college or university are not eligible to receive the degree until they have completed at least one academic year at Northeastern University immediately preceding their graduation. For more information on transferring, see Admission of Transfer Students, page 22.

■ Graduation with Honors See page 49.

■ **Transfer Aerospace Co-op Program**

For transfer students, the school offers a three-year Bachelor of Engineering Technology degree program with a major in aerospace maintenance engineering technology. This B.E.T. program, in conjunction with East Coast Aero Technical School, is designed for students who have successfully completed a program in aircraft and power plant mechanics or similar technician programs. To enter the program, students must pass College Algebra, Pre-Calculus, Calculus I, and Chemistry. During their three years of undergraduate study, these students participate in the cooperative education system.

Graduates of this program are prepared to pursue careers in the aircraft industry's technical, support, and management positions; to be members of engineering teams in spacecraft or aircraft component manufacturing; and to assume design/applications positions in both civilian and military aerospace markets.

The aerospace maintenance engineering technology program includes the following courses: Calculus II and III, English, Principles of Economics, Physics I, II, and III, Physics Laboratory I, II, and III, Engineering Graphics I, Computer Programming, social science/humanities electives, Mechanics A and B, Stress Analysis A, Materials A and B, Electricity and Electronics I, Thermodynamics A, Fluid Mechanics A, Technology Laboratory A or C, technical electives, an open elective, and Stress Analysis B or Thermodynamics B.

■ **Part-Time Evening and Weekend Programs**

The school also offers six- and seven-year part-time curricula leading to the degree of Bachelor of Engineering Technology in the following areas:

- aerospace maintenance engineering technology (transfer),
- computer technology,
- mechanical engineering technology,
- mechanical-structural engineering technology,
- electrical engineering technology.

Classes are held either in the evenings or on Saturdays. The evening classes generally meet two times per week. For more information on admission to these programs, contact the School of Engineering Technology office, 120 Snell Engineering Center.

■ **Accreditation**

The electrical and mechanical engineering technology baccalaureate day programs and the part-time baccalaureate programs in mechanical, mechanical-structural, and electrical engineering technology are accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC/ABET). The Associate in Engineering degrees with majors in electrical and mechanical engineering technology are also accredited by TAC/ABET.

■ **Facilities**

Computers The University and college provide major computer resources. Departments also make available dedicated computer systems. Several types of computers are available in the computer technology laboratories, including a mainframe and a variety of personal computers. Certain software courses use the microcomputer laboratories. Fifty IBM XT's and AT's in a local area network support freshman computer graphics and design courses.

Some other facilities accessible to engineering technology students include a Digital Equipment Corporation (DEC) VAX 8650 with hard-wired terminals and extensive phone access, and a DEC VAX 11/785 supporting 32 terminals. The Computing Resource Center provides access to a VAX 8650 and 170 IBM PCs for general use, and a Computervision CADDStation system supporting five high-resolution color workstations and one monochrome workstation.

Computer facilities available to the mechanical engineering technology student include various microcomputers for in-laboratory analysis with the Computervision CADDStation system and the SUN system, both of which use UNIX.

Laboratories Laboratories are an integral part of the electrical and mechanical engineering technology curricula. Electrical laboratory courses include topics in circuits, electronics, computers, measurements, controls, microwaves, and power systems. Facilities run from integrated electronic devices to precision microwave equipment, and from simple electromechanical devices to power equipment. A variety of microcomputers, including IBM PCs and Apples, are available for laboratory experimentation, data reduction, and computation. VAX terminals are available in the laboratory for direct access to the University's mainframe computer.

The mechanical engineering technology laboratories contain equipment ranging from an electron microscope and ultrasonic measuring devices to pumps and weirs. Students working on thermofluids projects may use a turbine and various types of engines. A materials science laboratory provides research microscopes, various furnaces, a fluid-to-fluid extrusion press, X-ray diffraction equipment, an electron microscope, and other related equipment. Facilities are provided for the mechanics and design areas, vibrations, experimental stress analysis, and materials testing.

■ Student Services

Office of Engineering Technology Student Services The Office of Engineering Technology Student Services, in 120 Snell Engineering Center, is the primary source of assistance for students in the School of Engineering Technology. The office handles transfer-of-credit petitions and assists students having problems related to study skills, academic difficulties, and choice of major or career. It also houses the records of upperclass engineering technology students. (Freshmen records are kept by the Office of Freshman Affairs, which also handles freshmen transfer credit petitions and other matters involving records.) Freshmen are, however, welcomed by the office and encouraged to take advantage of its services and programs.

Minorities in Engineering Through the Northeastern University Progress in Minorities in Engineering Program (NUPRIME), the college seeks to expand educational opportunities for qualified Blacks, Puerto Ricans, Mexican-Americans, and Native Americans. Advising and tutorial services are among the support services NUPRIME offers.

Women in Engineering Technology Increasing numbers of women are entering engineering technology programs each year. Approximately 12 percent of the entering class is female, and opportunities for cooperative work assignments and upon graduation are numerous. Any woman who has mathematical and scientific aptitude and is interested in technical work should consider the variety of engineering technology programs offered at Northeastern.

■ Sample Freshman-Year Program

The freshman-year program of studies in the School of Engineering Technology is similar for all majors.

First Quarter

College Algebra
Physics I
English/Writing
Engineering Design Graphics I
Physics Laboratory I

Second Quarter

Pre-Calculus
Physics II
English/Literature
Computer Programming for Engineering Technology*
Physics Laboratory II

Third Quarter

Calculus I
Physics III
English/Technical Writing
Physics Laboratory III
Engineering Design Graphics II*

*Computer technology students take Introduction to Programming and Basic Computer Organization instead of Computer Programming for Engineering Technology and Engineering Design Graphics II.

Note: In addition to the above courses, students may choose to take Basic ROTC.

Computer Technology Program

Nonna K. Lehmkuhl, M.Ed., M.S., *Coordinator for Computer Technology*

Degree Offered: Bachelor of Engineering Technology

The computer technology program is designed to meet some of the personnel needs of the complex computer industry. Graduates of this program may become an integral part of the engineering support team that develops techniques to implement an engineering design project. As members of such a research and production team, they work closely with engineers.

■ Professional Preparation

The computer technology program provides degree candidates with both academic and technical learning experiences. These experiences are based on the core curriculum, which supports the present-day hardware and software systems industry. Students also choose technical electives in their area of interest. The theory courses that are offered are at the upper end of the technology spectrum. These high-level theory courses provide the means for students to continue their educational and professional development beyond the baccalaureate level. Some students pursue the Master of Technology degree or, through supplemental course work, the more theoretical Bachelor of Science degree.

■ Five-Year Cooperative Education Program

Computer technology deals with the design and application of equipment and systems related to computer hardware and software. Its major functions include:

- interfacing the computer with process plants or machinery;
- programming the computer for engineering, scientific, and business applications;
- designing, engineering, and testing computers;
- interfacing computers with various types of equipment for automatic drafting, data collection, design, and display.

Because of the interdependence of high-speed computers and electrical and electronic technology, this program includes courses in both circuit analysis and electronics along with basic courses in mathematics and physics.

The freshman year of the computer technology major is similar to that of the electrical and mechanical engineering technology majors, with the exception of Introduction to Programming and Basic Computer Organization. These courses are taken in place of Computer Programming for Engineering Technology and Engineering Design Graphics II.

An introduction to computer programming and the study of basic computer organization gives freshmen early contact with the major field of study. To encourage self-expression, the freshman year includes literature and engineering graphics.

Upperclass students balance hardware and software courses, developing skills in various hardware systems from the micro to the mainframe and moving from languages to the design of software, such as an operating system. A laboratory provides upperclass students with hands-on experience in both areas. In each area, course content is updated continually to keep pace with an ever-changing technology. Students may specialize in either hardware or software or continue with both.

■ **Course Requirements**

General

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|--------------------------|-------------|-------------------------------------|-------------|
| College Algebra* | 4 | Physics I, II, and III* | 12 |
| Pre-Calculus* | 4 | Physics Laboratory I, II, and III* | 3 |
| Calculus I* | 4 | Engineering Graphics I* | 4 |
| Calculus II and III | 8 | Introduction to Programming* | 4 |
| English* | 12 | Basic Computer Organization* | 4 |
| Principles of Economics† | 4 | Social Science/Humanities electives | 16 |

Professional

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|-------------------------------|-------------|--------------------------------|-------------|
| Circuit Analysis I and II | 8 | Advanced Computer Organization | 4 |
| FORTRAN | 4 | CPU Hardware Architecture | 4 |
| Semiconductor Logic | 4 | Non-numerical Algorithms | 4 |
| Electronics I | 4 | Microperipheral Hardware | 4 |
| Modern Programming Techniques | 4 | Numerical Algorithms | 4 |
| Computer Logic | 4 | Data Communications Methods | 4 |
| C Language | 4 | Industrial Software | 4 |
| Assembly Language | 4 | Industrial Hardware | 4 |
| Introduction to CPU Hardware | 4 | Computer Peripheral Hardware | 4 |
| Technical electives‡ | 16 | Writing Workshop | 1 |

*These courses are usually taken in the freshman year.

†This course is usually taken in the sophomore year.

‡Technical electives may include Computer Networks or Computer Security.

Electrical Engineering Technology Program

John Kaczorowski, M.S., *Coordinator for Electrical Engineering Technology*

Ronald E. Scott, Sc.D., P.E., *Associate Coordinator for Electrical Engineering Technology*

Degree Offered: Bachelor of Engineering Technology

The electrical engineering technology program aims to supply some of the personnel needs of complex and high-technology industries. The nature of high-technology industries demands close communication and cooperation between technologists and engineers.

■ Professional Preparation

The electrical engineering technology program is designed to provide the student with a broad education through a basic core curriculum. The theory courses that are offered are at the upper end of the technology spectrum. Technical electives are offered to accommodate the student's area of interest.

The higher theoretical level provided in the program also prepares students to continue their education beyond the Bachelor of Engineering Technology degree. These continued studies could be toward a Master of Technology degree or, through supplemental course work, could prepare students for more theoretical engineering science subject areas.

Electrical engineering technology deals with the design and operation of equipment and systems related to power, communications, data processing, and electrical control. Its major functions include:

- generation, transmission, and distribution of electrical energy for light and power purposes;
- development and production of equipment for telephone, radio, television, radar, and communication;
- design and construction of data-processing systems and analog or digital computers;
- application of electrical and electronic devices in the control of processes and manufacturing.

■ Five-Year Cooperative Education Program

Since electrical engineering technology derives many of its fundamentals from developments in the pure sciences, the program of study begins with basic courses in mathematics and physics. In addition, the freshman year includes literature and engineering graphics to aid students in developing skills with which to express themselves. The freshman-year program of studies is similar for electrical and mechanical engineering technology. (See page 141.)

In the upperclass years, courses are divided into four related sequences: circuits and systems, including feedback control; microwave devices; energy conversion, emphasizing electromagnetic devices; and laboratory work associated with all of the aforementioned. Current practice is stressed. Senior year electives enable students to acquire both depth and breadth.

■ Course Requirements

General

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|--------------------------------|-------------|-------------------------------------|-------------|
| College Algebra* | 4 | Computer Programming for | |
| Pre-Calculus* | 4 | Engineering Technology* | 4 |
| Calculus I* | 4 | Physics I, II, and III* | 12 |
| Calculus II and III† | 8 | Physics Laboratory I, II, and III* | 3 |
| English* | 12 | Social Science/Humanities electives | 20 |
| Principles of Economics† | 4 | Speech/Communication elective | 4 |
| Engineering Graphics I and II* | 8 | Open elective | 4 |

Professional

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|------------------------------|-------------|---------------------------|-------------|
| Circuit Analysis I and II† | 8 | Distributed Systems | 4 |
| Circuit Analysis III and IV | 8 | Circuits Laboratory I† | 2 |
| Electronics I, II, and III | 12 | Circuits Laboratory II | 2 |
| Control Engineering I and II | 8 | Electronics Laboratory | 2 |
| Engineering Analysis I | 4 | Advanced Electronics | |
| Energy Conversion | 4 | Laboratory I, II, and III | 6 |
| Electrical Measurements | 4 | Pulse and Digital I | 4 |
| Mechanics† | 4 | Technical electives‡ | 16 |
| Digital Computers I and II | 8 | Writing Workshop | 1 |

*These courses are usually taken in the freshman year.

†These courses are usually taken in the sophomore year.

‡Technical electives may include Power Systems or Communication Systems.

Mechanical Engineering Technology Program

Thomas E. Phalen, M.S., P.E., *Coordinator for Mechanical Engineering Technology*

Degree Offered: Bachelor of Engineering Technology

The objectives of this program are to prepare the graduate for support activities as a technologist in the broad field of mechanical engineering technology. A technical field that deals with the use of machinery to harness power resources and perform useful work, mechanical engineering technology is concerned with static forces, motion, and the kinetics of devices activated by hydraulic, electrical, mechanical, or thermodynamic forces. Major functions of the mechanical engineering technologist include:

- design and installation of all kinds of machinery, from pocket watches to the largest energy-producing facilities;
- development and production of engines and transport equipment, as in automobiles, aircraft, ships, or railway cars;
- construction and operation of furnaces, boilers, as well as heating and air-conditioning equipment, for the control of atmospheric and environmental conditions and associated heat transfer.

■ Professional Preparation

Program participants apply principles of science and mathematics to chosen fields, converting theories into practical techniques and processes. They are shown how to communicate technical information effectively so that they may become integral components of an engineer-technologist-technician design and operations team.

■ Five-Year Cooperative Education Program

Since machinery is the predominant concern of the mechanical engineering technologist, the program of study offers considerable training in the principles underlying the design and operation of engines, power transmission devices, machine tools, and other machinery. This emphasis, of course, implies a thorough study of the physical laws concerning motion and transfer of energy. The study of materials, thermodynamics, and applied mechanics occupies a prominent place in the program.

These studies help provide the degree candidate with a broad foundation in those fundamental subjects essential to the understanding of current practice. The freshman-year program of studies in the School of Engineering Technology is similar for electrical and mechanical engineering technology. (See page 166.) Seniors have elective choice and the opportunity for specialization.

■ Course Requirements

General

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|-------------------------|-------------|--------------------------------------|-------------|
| College Algebra* | 4 | Physics Laboratory I, II, and III* | 3 |
| Pre-Calculus* | 4 | Engineering Design Graphics I and II | 8 |
| Calculus I* | 4 | Computer Programming for | |
| Calculus II and III† | 8 | Engineering Technology | 4 |
| English I* | 12 | Social Science/Humanities electives | 16 |
| Principles of Economics | 4 | Chemistry | 4 |
| Physics I, II, and III* | 12 | Speech/Communications elective | 4 |
| Engineering Economy | 4 | | |

Professional

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|-------------------------------|-------------|--------------------------------------|-------------|
| Mechanics A and B† | 8 | Thermodynamics A and B | 8 |
| Mechanics C | 4 | Fluid Mechanics A and B | 8 |
| Stress Analysis A and B | 8 | Technical Laboratories A, B, C, D, E | 10 |
| Materials A | 4 | Refrigeration and Air Conditioning | 4 |
| Kinematics | 4 | Heat Transfer | 4 |
| Electricity and Electronics I | 4 | Machine Shop | 4 |
| Measurement and Analysis | | Technical electives‡ | 12 |
| Laboratory | 2 | Open elective | 4 |
| Mechanical Design A and B | 8 | Writing Workshop | 1 |

*These courses are usually taken in the freshman year.

†These courses are usually taken in the sophomore year.

‡Technical electives may include Mechanical Vibration or Power Generation.

College of Nursing



Eileen H. Zungolo, M.Ed., Ed.D., R.N., *Dean*
Ellen T. Daly, M.S., Ed.D., R.N., *Interim Associate Dean*
Christine E. Hoag, M.S., R.N., *Assistant Dean*

Associate Professors

Carol Easley Allen, M.A.,
Ph.D., R.N.
Jane F. Aroian, M.S.N., Ed.D.,
R.N.
Olivia M. Breton, M.Ed., R.N.
Elaine L. Capozzoli, M.A.,
R.N.
Janet A. Carroll, M.S., R.N.
Margery M. Chisholm, M.S.,
Ed.D., R.N.
M. Paula Fellows, M.S., R.N.
Jean P. Gilbert, M.S., Ed.D.,
R.N.
Lee Ann Hoff, M.S.N., Ph.D.,
R.N.

M. Marcia Lynch, M.S.N.,
D.N.Sc., R.N.
Susan C. Marchessault,
M.S.N., R.N.
Geraldine A. Medici, M.S., R.N.
Patricia Meservey, M.S.,
Ph.D., R.N.
Carole Shea, M.S., Ph.D., R.N.
Marilyn M. Smith, M.S.,
M.B.A., R.N.
Evelyn Tomes, M.S., M.A.,
Ph.D., R.N.
Nancy L. Walden, M.S.N., R.N.
Mary E. Wilcox, M.S., R.N.
M. Delaine Williamson, M.S.,
M.P.H., R.D.

Assistant Professors

Michelle Beauchesne, M.S.,
D.N.Sc., R.N.
Nancy N. Carr, M.S., R.N.
Mary Anne Gauthier, M.S.N.,
Ed.D., R.N.
Elizabeth M. Howard, M.S.,
Ph.D., R.N.
Joan M. Jacobson, M.S.,
Ph.D., R.N.
Linda M. Rosenbaum, M.S.N.,
Ph.D., R.N.

Lecturers

Margaret McAllister, M.A.,
Sp.Cl.N., R.N.
Donna H. Newby, M.S.N., R.N.
Elaine K. Small, M.S., R.N.

Degree Offered: Bachelor of Science in Nursing

The College of Nursing program is designed to prepare professional nurses able to practice nursing in any health-care setting, whether in the private or public sectors, traditional or high-tech. The need for professional nurses in the United States and abroad is well documented. This shortage translates into tremendous career opportunities for the nurse with a baccalaureate degree.

The role of the nurse has expanded considerably in the past 20 years, matching the change of pace in the health-care system. Rapid changes in health care, especially those related to age groups, care settings, and technology, require the professional nurse to be up-to-date in theory and practice, and in the ability to translate new knowledge and skills into health care for individuals, families, groups, and communities.

■ Professional Preparation

As primary health-care providers, nurses engage in a broad range of health promotion and teaching activities and coordinate care in every sector of the health-care system. They have major roles in wellness and health promotion, in acute care, and in long-term care for chronic illness. Accordingly, the College of Nursing aims to:

- provide individuals with a broadly based educational experience;
- prepare professional nurses capable of practicing in a variety of settings;
- provide the stimulus and education for ongoing personal and professional growth;
- provide professional opportunities for individuals from diversified backgrounds and/or who have changing career goals;
- provide opportunities through cooperative education for the integration of theory with practice in selected settings;
- provide the educational background for graduate study in nursing.

■ Five-Year Cooperative Education Program

The study of professional nursing is initiated in the freshman year, continued through the sophomore and middler years, and concentrated in the junior and senior years. Clinical experience in health-care settings is introduced in the second year of the program.

The nursing curriculum includes a variety of educational strategies and offers students the opportunity to develop the clinical skills and judgment that permeate the practice of professional nursing. The curriculum offers instruction in scientific theory and research in nursing, the humanities, and the biological, physical, and social sciences. To ensure a liberal education, more than 50 percent of the course work in the College of Nursing is centered in the sciences and humanities.

The curriculum also provides many opportunities for students to learn about the health needs of society and to begin providing high quality nursing care. Students have planned learning experiences in the classroom and health-care settings under the instruction and guidance of the faculty. Approximately 20 health-care agencies in the Greater Boston area provide students with experience in giving nursing/health care to clients in acute-care, day-care, and community health agencies.

Students completing the five-year baccalaureate nursing degree at Northeastern have acquired a much greater practical experience base than is available in many other baccalaureate nursing programs. The graduates of our program are able to make the transition into professional nursing practice with ease. Health care agencies actively seek out Northeastern University baccalaureate graduates.

■ Honors Program

The College of Nursing participates in the University Honors Program. See page 18.

■ Graduation Requirements

Candidates for the Bachelor of Science in Nursing must complete all prescribed courses in the curriculum. This totals a minimum of 177 quarter hours of credit. An overall quality-point average of C (2.0) and a C average in required nursing courses are necessary for graduation. In addition, candidates must meet the requirements of the Department of Cooperative Education to be eligible for their degree.

■ Graduation with Honors See page 49.

■ Special Requirements

Every student must have a complete physical examination, including a tuberculin test, before registering for first-quarter classes. Similarly, proof of immunization against measles and German measles is required unless a satisfactory antibody titre against German measles is demonstrated. All students must carry malpractice insurance. Arrangements for this insurance are made by the University. Students in the College of Nursing are required to wear the school uniform in clinical laboratory areas during academic quarters. A modification of the uniform is worn during cooperative work periods. All students assigned to a clinical nursing course must be certified in cardiopulmonary resuscitation (CPR). Students enrolled in a community health nursing course must have access to a car.

■ Transfer Credit

Credit is granted toward a Northeastern degree for any reasonably equivalent course with a C (2.0) or better grade from another accredited institution. In addition, nursing courses are evaluated by the College of Nursing faculty to determine whether the courses meet curriculum requirements. Students requesting transfer credit must provide supporting documentation such as transcripts and course descriptions.

Transfer students are accepted in September, January, April, and June. A specially designed option is offered in the fall quarter to enable students to meet requirements to enter the clinical nursing courses in the sophomore year. For more information, see Admission of Transfer Students, page 22.

■ The R.N. to B.S.N. Program

The College of Nursing accepts registered nurses who wish to complete requirements for the Bachelor of Science in Nursing degree. The length of the program varies, depending on the individual's previous educational experience and ability to achieve advanced placement through selected testing methods. The college accepts either the Act Proficiency Examination Program (ACT PEP) or the National League for Nursing Mobility Profile II Examination for advanced placement of the registered nurse student.

■ Facilities

The college occupies Robinson Hall on the main campus of the University. This location allows students to participate in all the academic and extracurricular activities of the University. In addition to faculty and administrative offices, a nursing resource unit is available for student use. The Nursing Resource Unit

(NRU), which is located in 208–209 Robinson Hall, is a simulated hospital setting for student learning. The unit houses sophisticated equipment, such as the ACTRONICS interactive video system for CPR (cardiopulmonary resuscitation) learning, as well as several personal computers and a selection of computer-assisted instructional software. Also, professional nursing periodicals and other resource materials are available for student use.

The College's Office of Student Affairs, located in 211 Robinson Hall, is the central source of academic support services and assistance to undergraduate students in the College of Nursing. Students are assigned a nursing faculty adviser by this office, and all student files are maintained here.

■ **Affiliations**

The College of Nursing is a member of the National Student Nurses' Association (NSNA). All College of Nursing students are eligible to join the NSNA, which is the largest independent student organization in the country. Membership benefits include a subscription to *Imprint*, scholarships, reduced rates for the *American Journal of Nursing*, monitoring of legislation that affects nursing students, and educational programs and conventions.

■ **Student Government**

Students have both a right and a responsibility to participate in College of Nursing policy making and evaluation. Representatives of the student body hold membership on the Academic Standing Committee, the Curriculum Committee, and ad hoc committees. Student representatives may volunteer, be elected, or be appointed by the Office of the Dean.

■ **Accreditation**

The program of the College of Nursing is fully accredited by the National League for Nursing and approved by the Board of Registration in Nursing of the Commonwealth of Massachusetts. This accreditation and approval indicate that the program meets educational standards for faculty, curriculum design, student quality, and overall University support. The College of Nursing subscribes to the standards established by the American Association of Colleges of Nursing, of which it is a member.

■ **Certification/Licensure**

The college offers a five-year curriculum that leads to the degree of Bachelor of Science in Nursing and allows graduates to take the National Council Licensing Examination (NCLEX) to become registered nurses. Nurses must meet specific requirements to obtain a license from the state in which they wish to practice. For Massachusetts licensure, these include graduating from a program approved by the Board of Registration in Nursing of the Commonwealth of Massachusetts and passing the National Council Licensing Examination for Registered Nurses.

■ **Graduate Education** For information on graduate degrees in nursing, see page 207.

■ Sample Freshman-Year Program

First Quarter

Human Biology
Fundamentals of Mathematics
English
Nursing

Second Quarter

General Chemistry
Anatomy and Physiology I
English
Nursing

Third Quarter

General Chemistry
Anatomy and Physiology II
Sociology
Human Nutrition

■ Course Requirements

General

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|----------------------------------|-------------|-------------------------------------|-------------|
| Human Biology | 4 | Growth and Development I and II | 8 |
| English | 8 | Pharmacology | 3 |
| General Chemistry | 10 | Fundamentals of Psychology I and II | 8 |
| Mathematics | 4 | Principles of Sociology | 4 |
| Microbiology | 4 | Social Anthropology | 4 |
| Anatomy and Physiology | 12 | Electives* | 28 |
| Middler-Year Writing Requirement | 4 | | |

Professional

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|--|-------------|-----------------------------------|-------------|
| Introduction to Professional Nursing and the Health System | 4 | Nursing, Common Problems | 7 |
| Introduction to the Theoretical Basis for Nursing Practice | 4 | Psychiatric-Mental Health Nursing | 7 |
| Human Nutrition | 4 | Medical-Surgical Nursing | 9 |
| Nursing, Basic Human Needs I | 4 | Maternal-Child Nursing | 9 |
| Nursing, Basic Human Needs II | 6 | Community Health Nursing | 9 |
| Pathophysiological Concepts for Clinical Nursing | 6 | Issues in Contemporary Nursing | 5 |
| | 4 | Introduction to Nursing Research | 4 |

*Designated electives are 8 Q.H. of humanities, 4 Q.H. of history, 4 Q.H. of computer science, and 12 Q.H. of general electives.

■ Electives

The College of Nursing offers electives that enable students to satisfy their personal objectives.

| <i>Course</i> | <i>Q.H.</i> |
|---|-------------|
| Advanced Clinical Care | 4 |
| Health Assessment | 4 |
| Independent study elective | 2 |
| Life Crisis Analysis and Response | 4 |
| The Nurse Entrepreneur | 4 |
| The Nurse Planner and Coordinator of Nursing Care | 4 |

College of Pharmacy and Allied Health Professions



James J. Gozzo, Ph.D., *Dean*

Mehdi Boroujerdi, Ph.D., *Associate Dean, Pharmacy, and Director, Graduate School, Pharmacy and Allied Health Professions*

Patrick F. Plunkett, Ed.D., *Associate Dean, Allied Health Professions*

Ann M. Ahern, M.Ed., *Director, Office of Student Services*

Nancy P. Warner, M.S., *Academic Counselor*

Kathleen T. Foley, A.S., *Assistant to the Dean*

Carol M. Konis, *Assistant to the Dean*

Barry Kass, M.B.A., *Director, Continuing Education and Development*

Frances Wright, B.S., *Director, Health Careers Opportunity Program*

Northeastern University recognizes the increased demand for well-educated pharmacists and allied health professionals. The College of Pharmacy and Allied Health Professions has pledged to meet this need through a unique combination: the Cooperative Plan of Education and a highly innovative academic program. This program offers students the opportunity to prepare themselves to become effective professional practitioners, to enter graduate schools, and to obtain employment in the many areas responsible for the delivery of health care.

■ **Professional Preparation**

The fundamentals of the college's approach to health-care education are as follows:

- a curriculum of highly relevant and closely integrated basic courses in the physical, biological, behavioral, and administrative sciences;
- on-site involvement in clinical patient care;
- a cooperative education work program, including a pharmacy externship-internship period and a clinical component;
- a commitment to the search for and advancement of new and progressive concepts, ideas, and philosophies of education and professional practice.

■ **Honors Program**

The College of Pharmacy and Allied Health Professions participates in the University Honors Program. See page 18.

■ **Graduation with Honors** See page 49.

■ **Facilities**

The college occupies the Mugar Life Sciences Building on the main campus of the University. This building and the well-equipped laboratories and classrooms of the Amelia Peabody Health Professions Center fulfill the physical needs of a growing and progressive college. In addition to faculty and administrative offices, a drug information and resource center, and the graduate school, there are laboratories for clinical chemistry, medicinal chemistry, prescription pharmacy, hematology, immunology, pharmacology, respiratory therapy, health information administration, and clinical microbiology. Animal rooms and a wide range of audiovisual materials and equipment are also housed in this five-story structure. Research facilities are available for upperclass students who participate in original research projects.

■ **Transfer Credit**

The College of Pharmacy and Allied Health Professions may accept qualified transfer students who have successfully completed one or more years of preprofessional course work in an accredited college or university. No student transferring from another college or university is eligible to receive a degree until the last three years of academic work immediately preceding graduation have been completed at Northeastern. Exceptions to this requirement may be made for students transferring from another college of pharmacy. For more information, see page 22.

■ **Accreditation**

Each of the programs offered by the college is accredited by the appropriate professional group. The college holds memberships in both the American Association of Colleges of Pharmacy and the American Society of Allied Health Professions.

■ **Graduate Education** For information on graduate degrees, see page 207.

Health Information Administration Program (Health Record Administration)

Leslie A. Blide, Ed.D., R.R.A., *Assistant Professor and Acting Director*

Degree Offered: Bachelor of Science

Northeastern's program provides an opportunity for students to acquire the knowledge and skills necessary to design, implement, and maintain manual and computerized health information systems; to plan, organize, and direct medical record services; to develop, analyze, and evaluate medical data and data systems; to work with medical and administrative staffs; and to participate in research projects which use health information.

■ Professional Preparation

Health information administrators organize, manage, and evaluate medical record services in health facilities and in industry. They also market, design, and implement medical computer systems; work as members of consulting teams for major consulting firms; and analyze data and manage departments for hospitals, insurance companies, federal agencies, and research institutes.

■ Five-Year Cooperative Education Program

The Health Information Administration Program is offered on the Cooperative Plan of Education. Successful completion of the prescribed curriculum, including directed study at an affiliated health center, will permit the awarding of a bachelor of science degree. Graduates are eligible to take the national registration examination given by the American Medical Record Association.

In the first two years of the program, students concentrate on liberal arts and sciences, including the required human anatomy and physiology courses and an overview of microbiology. Courses in health-care science help the student prepare for a role in health administration and health-care delivery.

The program offers the opportunity for preparation in administration, departmental and hospital management and organization, and data processing. The professional courses in health information science, medical terminology, and hospital law are complemented by directed applied study in health information science at an affiliated health facility.

■ Certificate Program

The Health Information Administration Certificate Program is designed for candidates holding a baccalaureate or master's degree who desire a new career. The three-quarter curriculum offers students who have demonstrated leadership potential and self-direction the opportunity to participate in an accelerated program that includes an integrated clinical practice experience. This clinical practice begins in the second quarter and includes a three-week management experience at the conclusion of the last quarter.

■ Accreditation

The Health Information Administration Program is accredited by the Committee on Allied Health Education and Accreditation (CAHEA) of the American Medical Association in cooperation with the Council on Education of the American Medical Record Association (COE-AMRA).

■ **Sample Freshman-Year Program**

First Quarter

Biology I
English I
Mathematics
Orientation to Health Records I
Psychology

Second Quarter

Arts and Sciences elective
Biology II
Mathematics
Professional Dynamics in
the Health-Care Delivery System

Third Quarter

Arts and Sciences elective
English II
Microbiology
Psychology

Note: In addition to the above courses, students may choose to take ROTC.

■ **Course Requirements**

General

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|---|-------------|--------------------------------------|-------------|
| English Composition and English Literature* | 8 | Psychology* | 8 |
| Mathematics | 8 | Sociology <i>or</i> Anthropology | 4 |
| Biology I and II* | 8 | Arts and Sciences electives | 16 |
| Microbiology* | 3 | Introduction to Communication Skills | 4 |
| Organizational Behavior | 4 | Electives | 12 |
| Introduction to Computer Science | 4 | Middler-Year Writing Requirement | 1 |

Professional

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|--|-------------|---|-------------|
| Language of Health Professions | 2 | Directed Practice | 8 |
| Health Records Science I—IV | 16 | Medical Computer Applications | 4 |
| Language of Medicine | 4 | Quality Assurance | 4 |
| Foundations of Medical Science | 6 | Independent Study | 4 |
| Hospital Law | 2 | Special Topics | 4 |
| Management of Health Record Services | 12 | Health Record Professional | 2 |
| Introduction to Health Data Research | 4 | Professional Dynamics in the Health-Care Delivery System* | 4 |
| Seminar in Health Records | 2 | Introduction to Data Processing for Health Professionals | 4 |
| Statistics | 4 | Anatomy and Physiology | 10 |
| Training and Development for Health-Care Professionals | 2 | Systems Analysis | 4 |

*These courses are usually taken in the freshman year.

Department of Cardiopulmonary Sciences

Mary E. Watson, Ed.D., *Associate Professor and Acting Chairperson*

Associate Professors

Thomas A. Barnes, Ed.D.

Patrick F. Plunkett, Ed.D.

Assistant Professor

Glen J. Low, M.Ed.

Degree Offered: Bachelor of Science in Respiratory Therapy

■ Respiratory Therapy Program

Respiratory therapy is an allied health specialty instrumental in the diagnosis, treatment, management, and preventive care of patients with cardiopulmonary problems. These patients may be found in newborn nurseries, surgical and medical units, emergency rooms, outpatient departments, and intensive care units. They may be suffering from a variety of acute and chronic conditions that are life threatening or disabling.

■ Professional Preparation

Respiratory therapists are involved in the treatment of cardiac and pulmonary disorders, such as cardiac failure, asthma, pulmonary edema, emphysema, cerebral thrombosis, drowning, hemorrhage, and shock. With the assistance of sophisticated ventilators and monitoring equipment, respiratory therapists are an essential part of the critical-care team. Responsible for life support of the patient through airway management, artificial ventilation, external cardiac massage, and many other sophisticated emergency support measures, the respiratory therapist is a life-support specialist.

Routine patient care is also important. Working under physicians' orders, respiratory therapists carry out specific therapeutic measures. They must be experts in providing and recommending specialized modalities of respiratory care. They must be competent in such areas as medical gas administration, including oxygen; humidification, aerosols, and intermittent positive pressure breathing (IPPB); chest physiotherapy, cardiopulmonary resuscitation, mechanical ventilation, airway management, and pulmonary function studies; blood gas analysis; and physiologic monitoring.

Today, job prospects look good. The field of respiratory therapy is expanding rapidly to keep pace with the demand for new techniques to combat post-operative respiratory failure and to cope with such environmentally related problems as smoking and air pollution.

■ Five-Year Cooperative Education Program

Students enter the College of Pharmacy and Allied Health Professions as majors in the respiratory therapy program. Mathematics, chemistry, and the physical, biological, medical, and health sciences offer the bases for professional instruction in respiratory therapy. English, psychology, and elective courses in the humanities and social sciences offer a liberal arts background. Clinical study at the major teaching hospitals provides the opportunity for direct patient care and the immediate application of highly specialized techniques.

The curriculum leads to the bachelor of science degree in respiratory therapy and includes academic quarters at the University, a structured clinical program, and assigned co-op quarters. Successful completion of the first three and one-half years of the program makes students eligible for the first part of the examinations administered by the National Board for Respiratory Care.

■ **Perfusion Technology Certificate Program**

An accelerated program in cardiovascular perfusion technology is available for professionals with a baccalaureate or master's degree who are interested in a new career. Candidates must have the science background needed to master professional courses in the curriculum. The curriculum allows students to integrate didactic, laboratory, and clinical practice courses over a 12-month period. Graduates of the certificate program are eligible to take the National Board Examination for Certified Cardiovascular Perfusionists.

■ **Accreditation**

Both the degree and accelerated programs are accredited by the Committee on Allied Health Education and Accreditation, sponsored by the American Medical Association.

■ **Sample Freshman-Year Program**

First Quarter

English I
General Biology
General Chemistry I
Psychology
Respiratory Therapy Seminar I

Second Quarter

Animal Biology
Arts and Sciences elective
Mathematics
Professional Dynamics in the
Health-Care Delivery System
Respiratory Therapy Seminar II

Third Quarter

Calculus
English II
General Chemistry II
Microbiology
Respiratory Therapy Seminar III

Note: In addition to the courses above, students may choose to take Basic ROTC.

■ **Course Requirements**

General

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|------------------------|-------------|------------------------------------|-------------|
| Biology | 8 | Computer electives | 8 |
| Anatomy and Physiology | 10 | English Composition and Literature | 8 |
| Microbiology | 4 | Arts and Sciences electives | 24 |
| General Chemistry | 10 | Middler-Year Writing Requirement | 1 |
| Physics | 4 | Psychology | 4 |
| Mathematics | 8 | | |

Professional

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|---|-------------|--|-------------|
| Respiratory Therapy Seminars | 3 | Introduction to Pediatric Respiratory | |
| Clinical Seminars | 2 | Care | 2 |
| Professional Practice Labs I, II, III, and IV | 4 | Cardiopulmonary Laboratory | |
| Cardiopulmonary Physiology | 4 | Techniques | 4 |
| Advanced Clinical Physiology | 4 | Cardiopulmonary Laboratory Practice | 1 |
| Pathology | 4 | Clinical Practice I | 4 |
| Introduction to Patient Care | 4 | Clinical Practice II | 4 |
| Introduction to Respiratory Care | 4 | Advanced Medical Monitoring | 4 |
| Respiratory Care for the Med-Surgical Patient | 4 | Respiratory Care for the Neonatal Patient | 4 |
| Moral Problems in Medicine | 4 | Cardiopulmonary Diseases | 4 |
| Respiratory Care for the Critical Patient | 4 | Professional Dynamics in the Health-Care Delivery System | 4 |
| Pharmacology | 4 | Professional electives | 16 |
| | | Clinical Practice III | 6 |

Department of Medical Laboratory Science (Medical Technology)

Edward W. Schroder, M (ASCP), Ph.D., *Associate Professor and Chairman*

Professor

James J. Gozzo, Ph.D.

Associate Professors

Judith T. Barr, CLS (NCA), Sc.D.

Britta L. Karlsson, M (ASCP),
M.S.

Assistant Professors

Panayiota Araszkievicz, Ph.D.

Daniel H. Fisher, C (ASCP),
Ph.D.

Degrees Offered: Bachelor of Science, Associate in Science

Medical technology involves the application of principles of natural, physical, and biological sciences to laboratory determinations used in the diagnosis and treatment of disease and in the maintenance of health.

■ Professional Preparation

The demand for properly educated and certified medical technologists, medical laboratory technicians, and research or industrial laboratory scientists is expected to increase as a result of greater emphasis on the quantity, quality, and efficiency of health-care delivery, and as commercial applications of biotechnology are developed. With educational opportunities available in hematology, immunohematology, chemistry, microbiology and immunology, students have the opportunity to prepare themselves for positions not only in a hospital laboratory, but also in biological research, industrial, and governmental institutions. Related cooperative education experiences in hospitals, clinics, research, and industry enable graduates to explore a variety of career options. Opportunities for six-month co-op work experiences in foreign countries are available to interested students. Qualified graduates have been highly competitive for admission to graduate and professional schools.

■ Five-Year Cooperative Education Program

Students enter the College of Pharmacy and Allied Health Professions in the Department of Medical Laboratory Science. The college offers a five-year modified cooperative course of study leading to the bachelor of science degree.

During the junior and senior years, qualified medical technology students are assigned to the hospital components of the program. To qualify, students must have an acceptable quality-point average; must have successfully completed all course requirements, including biology, chemistry, mathematics, and medical laboratory science; and must have met other criteria of the Clinical Studies Admission Committee. The professional courses in hematology, microbiology, immunology, parasitology, chemistry and instrumentation, and immunohematology are included in both the University and the hospital components of the program. Baccalaureate students have the option to pursue a research project in one of the above concentrations, or to complete a computer science minor, or other relevant minors.

Students in the five-year major who decide not to complete their course of study may transfer into the three-year associate degree program.

■ Three-Year Co-op Program

Students enter the College of Pharmacy and Allied Health Professions as medical laboratory science (medical laboratory technician) majors. This three-year modified co-op program leads to an associate degree.

The first two years of academic study parallel the baccalaureate program. During the third year, students alternate related co-op work experience with clinical applied studies at affiliated hospitals.

To qualify for clinical applied studies, students must have an acceptable quality-point average and must have successfully completed all other requirements of the department.

■ **Certification**

Upon completion of the professional component of the three-year program, students are eligible to take national certification examinations for medical and clinical laboratory technician.

Upon satisfactory completion of the five-year baccalaureate degree, the student should be eligible to take national certification examinations in medical technology and clinical laboratory science or in one of the specialties of medical laboratory science. Some states may require additional licensure examinations.

■ **Certificate Programs**

The postbaccalaureate certificate (PBC) programs in Medical Laboratory Science provide the opportunity for students who possess a baccalaureate degree and sufficient background in the biological and chemical sciences to become eligible for certification in one of the following areas: microbiology, chemistry, hematology, or immunohematology. The student is required to complete from 26 to 33 quarter hours of professional coursework (depending upon the specialty area), which must include clinical applied study at an affiliated clinical site. After completion of program requirements, students should be eligible to take the national certification examination in a specialty area.

■ **Accreditation**

The associate in science and the bachelor of science degree programs are accredited by the Committee on Allied Health Education and Accreditation of the American Medical Association.

■ **Sample Freshman-Year Program**

First Quarter

Mathematics or Calculus
General Biology
Medical Laboratory Science
Orientation I
English I
Elective

Second Quarter

General Chemistry I
Animal Biology
Professional Dynamics in the
Health-Care Delivery System
Medical Laboratory Science
Orientation II
Computer Science elective

Third Quarter

Electives
English II
Urinalysis
General Chemistry II

■ Course Requirements for the Baccalaureate Degree

General

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|---------------------------------|-------------|--|-------------|
| English and English Literature* | 8 | Genetics and Developmental Biology | 4 |
| Biology—General and Animal* | 8 | Physics | 10 |
| Mathematics or Calculus* | 4 | Humanities electives | 12 |
| General Chemistry* | 10 | Social Science electives | 8 |
| Organic Chemistry† | 10 | General electives (includes Statistics and Computer Science) | 16–20 |
| Physiology† | 8 | Middler-Year Writing Requirement | 1 |
| Cell Biology | 4 | | |

Professional

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|---------------------------------------|-------------|---|-------------|
| Medical Laboratory Science | | Advanced Clinical Microbiology | 4 |
| Orientation I and II* | 2 | Applied Clinical Study (at hospital) | 24 |
| Urinalysis* | 3 | Laboratory Management | 2 |
| Basic Hematology I† | 3 | Health Science Education | 2 |
| Basic Hematology II† | 3 | Parasitology† | 3 |
| Basic Immunohematology† | 4 | Senior Seminar | 2 |
| Basic Immunology† | 2 | Professional Dynamics in the Health-Care Delivery System* | 4 |
| Basic Chemistry and Instrumentation† | 5 | Clinimetrics | 2 |
| Basic Clinical Microbiology I and II† | 7 | Immunopathology | 3 |
| Advanced Hematology I and II | 4 | | |
| Advanced Immunohematology | 2 | | |
| Advanced Clinical Chemistry I and II | 8 | | |

*These courses are usually taken in the freshman year.

†These courses are usually taken in the sophomore year.

■ Course Requirements for the Associate Degree

General

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|---------------------------------|-------------|---------------------|-------------|
| English and English Literature* | 8 | Physiology† | 8 |
| Biology—General and Animal* | 8 | Humanities elective | 4 |
| Mathematics or Calculus* | 8 | Computer Science | 4 |
| General Chemistry* | 10 | General elective | 4 |

Professional

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|---|-------------|--|-------------|
| Medical Laboratory Science | | Basic Clinical Microbiology I and II† | 7 |
| Orientation I and II* | 2 | Basic Immunohematology† | 4 |
| Urinalysis* | 3 | Basic Immunology | 2 |
| Basic Hematology I† | 3 | Basic Clinical Chemistry and Instrumentation | 5 |
| Basic Hematology II† | 3 | Applied Study (at hospital) | 12 |
| Professional Dynamics in the Health-Care Delivery System* | 4 | Parasitology | 3 |

*These courses are usually taken in the freshman year.

†These courses are usually taken in the sophomore year.

Pharmacy Program

Department of Pharmaceutical Sciences

Richard C. Deth, Ph.D.,
*Professor and Acting
Chairperson*

Professors

Roger W. Giese, Ph.D.
James J. Gozzo, Ph.D.
Robert N. Hanson, Ph.D.

John L. Neumeyer, Ph.D.
Elliot Spector, Ph.D.

Associate Professors

Norman R. Boisse, Ph.D.
Mehdi Boroujerdi, Ph.D.
Robert A. Schatz, Ph.D.
Barbara L. Waszczak, Ph.D.

Assistant Professors

Nancy R. Chen, Ph.D.

Jonathan Freedman, Ph.D.
George C. Hwang, Ph.D.
Gerald S. Jones, Ph.D.

Clinical Associate Professor

Ralph H. Loring, Ph.D.

Clinical Instructor

James M. Dixon, M.S.

Department of Pharmacy Practice

Larry N. Swanson, Pharm. D.,
*Associate Professor and
Acting Chairperson*

Professors

Arnold S. Goldstein, L.L.M.
Gerald E. Schumacher,
Pharm.D., Ph.D.

Associate Professors

Robert J. Cersosimo,
Pharm. D.
Gerald R. Donehew, Ph.D.
Samuel J. Matthews,
Pharm. D.
Michael E. Montagne, Ph.D.

Assistant Professor

David I. Min, Pharm.D.

Clinical Assistant Professor

Todd A. Brown, B.S.

Degree Offered: Bachelor of Science in Pharmacy

■ Professional Preparation

The need for well-qualified pharmacists is likely to continue in direct response to the greater emphasis on health care and, in particular, to the newer and more diversified utilization of those now in practice in this country. The majority of pharmacists are associated with community practice, and some of these are self-employed. Hospital pharmacy and institutional practice have attracted a large number of practitioners and represent the fastest-growing areas of the profession. The increased use of the pharmacist as a drug consultant to the medical and nursing staffs of these institutions has broadened the scope of professional opportunity and given practitioners even greater involvement as part of the health team.

Pharmacy also offers careers in research, manufacturing, government, law enforcement, and education. A considerable number of our graduates have entered leading graduate and professional schools. Another significant trend is found in the increasing number of women entering the profession. Approximately 60 percent of the entering class is now composed of women.

■ Five-Year Cooperative Education Program

The college offers a five-year curriculum that leads to the degree of Bachelor of Science in Pharmacy. The curriculum offers instruction in each of three natural divisions: arts and sciences courses in general education (the humanities and social sciences); mathematics and the basic physical and biological sciences; and courses in the areas of professional instruction—medicinal chemistry, pharmacology, pharmaceuticals, pharmacy administration, pharmacy practice, and clinical pharmacy.

The curriculum offers a well-balanced blend of academic classroom and cooperative education work experiences. Students completing the five-year baccalaureate pharmacy degree at Northeastern complete up to 3,000 hours of combined co-op and clinical clerkship experiences—a much greater practical experience base than is available in many other pharmacy programs. These experiences enable pharmacy students to make the transition into pharmacy practice easily upon graduation. The

classroom experience is well structured and allows for the integration of the students' cooperative education experiences. In addition, the pharmacy program maintains close affiliations with many of the leading hospitals in the surrounding Boston area.

■ Graduation Requirements

Candidates for the Bachelor of Science in Pharmacy must complete all prescribed courses in the curriculum. This totals a minimum of 177 quarter hours of credit. An overall quality-point average of C (2.0) and a C average in required pharmacy courses are necessary for graduation. In addition, candidates must meet the requirements of the Department of Cooperative Education to be eligible for their degree.

■ Accreditation

The undergraduate pharmacy program offered by the College of Pharmacy and Allied Health Professions subscribes to the standards established by the American Council on Pharmaceutical Education and the American Association of Colleges of Pharmacy, of which it is a member.

■ Licensure

Pharmacists must meet certain requirements to obtain a license from the state in which they wish to practice. These requirements ordinarily include graduating from an accredited college of pharmacy, passing an examination given by a state board of pharmacy, and completing an internship or apprenticeship.

The internship is a period of supervised practical experience in a preceptor pharmacy. This is generally satisfied during the cooperative education periods commencing at the end of the student's second academic year. The salary earned during these periods of full-time employment may be used to help defray educational expenses. Students may apply up to 400 hours of the required academic clinical clerkship experience to their internship requirements. In addition, a college-directed externship adds to the total practice-oriented portion of the curriculum.

■ Sample Freshman-Year Program

First Quarter

Fundamentals of Mathematics *or*
Functions and Basic Calculus
General Chemistry I
Arts and Sciences elective
General Biology
Profession of Pharmacy

Second Quarter

Functions and Basic Calculus *or* Calculus
Professional Dynamics in the
Health-Care Delivery System
Animal Biology
English I

Third Quarter

Calculus *or* free elective
English II
General Chemistry II
Arts and Sciences elective

Note: In addition to the above courses, students may choose to take Basic ROTC.

■ Course Requirements

General

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|-------------------------------|-------------|----------------------------------|-------------|
| Fundamentals of Mathematics* | 4 | Physics† | 8 |
| Functions and Basic Calculus* | 4 | Organic Chemistry† | 10 |
| Calculus* | 4 | Anatomy-Physiology† | 10 |
| General Chemistry* | 10 | Biochemistry | 5 |
| English* | 8 | Arts and Sciences electives (7) | 28 |
| Biology* | 8 | Middler-Year Writing Requirement | 1 |

Professional

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|--|-------------|---|-------------|
| Pharmaceutical Calculations† | 4 | Professional Dynamics in the Health-Care Delivery System* | 4 |
| Pharmaceutics I and II, including laboratories | 12 | Professional electives (2) | 8 |
| Medicinal Chemistry/Pharmacology I, II, and III | 17 | Professional Practice Laboratory | 1 |
| Pharmacology Laboratory | 1 | Clinical Pharmacotherapeutics | 5 |
| Pharmaceutical Analysis and Quality Control | 4 | Pharmacokinetic Principles in Drug Therapy | 4 |
| Drug Information and Evaluation | 3 | Anti-infectives | 5 |
| Pathology | 4 | Parapharmaceuticals | 2 |
| Toxicology | 4 | Nonprescription Medication | 4 |
| Biopharmaceutics/Pharmacokinetics | 4 | Interpersonal Skills for Health Professionals | 4 |
| Jurisprudence | 4 | Pharmacy Externship | 4 |
| Pharmacy Administration | 4 | Social Pharmacology | 4 |
| Clinical Pharmacy Clerkship | 15 | Profession of Pharmacy* | 1 |
| Beginning Computer Use | 4 | | |
| Community Pharmacy Management <i>or</i> Hospital Pharmacy Management | 4 | | |

*These courses are usually taken in the freshman year.

†These courses are usually taken in the sophomore year.

Toxicology Program

Robert A. Schatz, Ph.D., *Associate Professor and Acting Director*

Lecturer

Diane M. Silverman, Ph.D.

Degree Offered: Bachelor of Science in Toxicology

Toxicology may be defined as the branch of science dealing with poisons, but it should not be restricted to this narrow definition. In its broadest sense, toxicology involves all aspects of adverse effects of chemicals on biologic systems. This includes the mechanisms of their harmful effects and the conditions under which these harmful effects occur as well as socioeconomic considerations and legal ramifications. Forensic toxicology is a hybrid of analytical chemistry and fundamental toxicological principles and is concerned with the medicolegal aspects of the harmful effects of chemicals.

The activities and contributions of toxicologists are many and varied. The biomedical toxicologist is concerned with intoxications by drugs and other chemicals as well as with the demonstration of drug safety or danger prior to release on the market.

Industrial or environmental toxicologists are concerned with the recognition, identification, and quantitation of the relative hazards from occupational or public

exposure to toxicants. This concern is closely related to private and government responsibilities to ensure the safety of workers and the general public in contact with industrial and commercial products.

■ **Professional Preparation**

The faculty of the College of Pharmacy and Allied Health Professions believes that increased concern over the safety of drugs, chemicals, and cosmetics throughout the environment and new legislation regarding toxic substances have created a need for toxicologists at the bachelor of science level.

Northeastern has created an innovative program in which diverse academic resources offer training to this new breed of toxicologist. The core curriculum is enhanced by contributions from the University's Institute of Chemical Analysis, Applications, and Forensic Sciences; the Northeastern University Marine Science Institute in Nahant; and the Environmental Engineering Department.

Personnel studies sponsored by private and federal agencies predict a great demand for toxicologists. Numerous federal and local laws aimed at protecting the environment, safeguarding employees in their workplaces, and protecting consumers against hazardous household products have created a critical shortage of toxicologists. Employment opportunities are being created in industry (chemical, cosmetic, and pharmaceutical firms) and government (Environmental Protection Agency, Food and Drug Administration, National Institute of Occupational Safety and Health), as well as in police departments and various clinical settings. Qualifying students may also consider entering law school, medical school, and graduate programs in toxicology.

■ **Five-Year Cooperative Education Program**

The toxicology program leads to the bachelor of science degree in toxicology in five years under the Cooperative Plan of Education. The curriculum is a combination of science, liberal arts, and professional courses that offers students the opportunity to prepare themselves to practice toxicology in a variety of settings. Required and elective professional courses may be selected from medical laboratory science, chemistry, biology, sociology, criminal justice, computer programming, mathematics, and earth sciences.

Toxicology students may begin their cooperative experience during the summer of their freshman year.

■ **Sample Freshman-Year Program**

First Quarter

General Biology
English I
Mathematics
Toxicology Orientation
Arts and Sciences elective

Second Quarter

Animal Biology
Functional Calculus
General Chemistry I
Professional Dynamics in the
Health-Care Delivery System

Third Quarter

Calculus
English II
General Chemistry II
Arts and Sciences elective

Note: In addition to the above courses, students may choose to take Basic ROTC.

■ Course Requirements

General

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|---------------------|-------------|----------------------------------|-------------|
| Mathematics* | 4 | General Biochemistry | 5 |
| Calculus* | 8 | Microbiology | 4 |
| General Chemistry* | 10 | Biostatistics and Computers† | 4 |
| English* | 8 | Electives | 28 |
| Biology* | 8 | Middler-Year Writing Requirement | 1 |
| Physics† | 8 | Cell Biology | 4 |
| Organic Chemistry† | 10 | Professional electives | 12 |
| Anatomy-Physiology† | 10 | | |

*These courses are usually taken in the freshman year.

†These courses are usually taken in the sophomore year.

Professional

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|---|-------------|---|-------------|
| Pharmaceutical Analysis and Quality Control | 4 | Toxicology Laboratory | 4 |
| Medicinal Chemistry/ Pharmacology I, II, and III | 17 | Community Health | 4 |
| Pathology | 4 | Epidemiology | 4 |
| Toxicology I, II, and III | 12 | Basic MLS Clinical Chemistry and Instrumentation | 5 |
| Pharmacology Laboratory | 1 | Professional Dynamics in the Health-Care Delivery System* | 4 |

*These courses are usually taken in the freshman year.

Health-Care Curriculum Open Option Program

Students who are undecided about a profession but are interested in pursuing a career in health care should explore the Open Option Program offered by the College of Pharmacy and Allied Health Professions.

The Open Option Program offers freshmen a core of courses designed to provide the basic scientific background required for each of the professional programs in the College of Pharmacy and Allied Health Professions in addition to a one quarter hour health careers seminar. Students are also introduced to basic principles of health-care delivery and health-care agencies and services, and to the attitudes, behavioral aspects, and policies that affect health-care systems. They also complete some of the prerequisite courses required of all the professional programs; thus they do not lose valuable time prior to selecting a major.

With the aid of advisers, students refine their career goals and familiarize themselves with what is expected in various health-care professions. Subsequent selection of a professional program may then proceed more smoothly and confidently.

■ Open Option Courses

In this plan, students may complete the core courses in the first-year curriculum without selecting a major and without loss of valuable time. Upon satisfactory completion of the first year of courses, students select a professional area in which to major. Professions in the college include pharmacy, health information administration, medical laboratory science, respiratory therapy, and toxicology. These are the courses offered in the first-year Open Option: Animal Biology, English Composition, Functions of Basic Calculus, Fundamentals of Mathematics, General Chemistry I and II, General Biology, Introduction to Literature, and Professional Dynamics in the Health-Care Delivery System.

Satisfactory completion of the nine courses in the Open Option core curriculum, as well as other courses completed during the first year, is necessary for admission to one of the professional programs of the college.

Special Note The Open Option plan does not apply to the Dental Hygiene Program.

Dental Hygiene Program

Degrees Offered: Associate and Bachelor of Science in Dental Hygiene

The Forsyth School of Dental Hygienists conducts a program of dental hygiene education in cooperation with Northeastern University. Students attend classes at both the Forsyth Dental Center and Northeastern. The dental hygienist is licensed to render preventive services to a patient under the supervision of a dentist, including administering dental prophylactic treatment, preparing dental radiographs, and teaching prescribed methods of maintaining dental health.

■ Two-Year Program

The first year includes courses in anatomy and physiology, chemistry, microbiology, histology, nutrition, dental materials, radiology, periodontology, pathology, head and neck anatomy, dental hygiene, and clinical dental hygiene instruction. In the second year, students take general courses, such as English, sociology, and psychology, and professional courses in public health, pharmacology, law and ethics, and dental hygiene. They also continue to receive clinical dental hygiene instruction.

■ Four-Year Program

Education at the baccalaureate level enhances the dental hygienist's opportunities, abilities, background, and values. The first year includes courses in general education and basic science with introductory courses in dental hygiene. The second and third years provide core dental hygiene courses in theory and practice. Students are eligible for licensure exams at the end of the third year. The fourth year provides opportunities for students to specialize in areas of dental hygiene or to increase their liberal arts background. This option is also open to postgraduate dental hygienists who already hold an associate degree in dental hygiene.

■ Accreditation

These programs are accredited by the Commission on Dental Accreditation of the American Dental Association, an accrediting body approved by the Department of Education and the Council on Post Secondary Accreditation.

■ Certification/Licensure

Students satisfactorily completing the programs will receive the Certificate in Dental Hygiene from the Forsyth School and the Associate in Science or Bachelor of Science in Dental Hygiene from Northeastern University. Graduates are required to fulfill the state dental hygiene licensure requirements before they may practice.

■ Admissions

Application should be made directly to the Forsyth School of Dental Hygienists Office of Admissions, 140 The Fenway, Boston, MA 02115. For an application and a copy of the college catalog, write that office or call 617-262-5200.

■ **Sample Freshman-Year Program for the Baccalaureate Degree**

First Quarter

Biology
Dental Hygiene Orientation
English I
Mathematics
Psychology

Third Quarter

Dental Anatomy
English II
General Chemistry
Microbiology
Sociology

Second Quarter

Biology
Dental Hygiene Orientation
General Chemistry
Mathematics
Professional Dynamics in
Health-Care Delivery Systems

■ **Course Requirements for the Baccalaureate Degree**

General

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|--------------------------------|-------------|--|-------------|
| English and English Literature | 8 | Humanities electives (includes English Writing) | 8 |
| Biology—General and Animal | 8 | Social Science electives (includes Psychology and Sociology) | 12 |
| Anatomy and Physiology | 10 | General electives (includes Statistics and Computer Science) | 14–28 |
| Mathematics | 8 | | |
| General Chemistry | 10 | | |
| Microbiology | 4 | | |

Professional

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|-------------------------------------|-------------|---------------------------------------|-------------|
| Dental Hygiene Orientation I and II | 4 | Law and Ethics | 2 |
| Dental Anatomy | 2 | Pain Control | 2 |
| Radiology | 3 | Community Health Extramural | 3 |
| Dental Hygiene | 12 | Research Study | 3 |
| Clinical Dental Hygiene | 23 | Advanced Public Health | 4 |
| Nutrition | 2 | Oral Health Gerontology | 4 |
| Histology | 2 | Advanced Principles of Dental Disease | 4 |
| Pathology | 4 | Advanced Periodontology Clinic | 2 |
| Periodontology | 2 | Interpersonal Skills | |
| Pharmacology | 3 | for Health Professionals | 4 |
| Head and Neck Anatomy | 2 | Professional Dynamics in | |
| Dental Materials | 2 | Health-Care Delivery Systems | 4 |
| Special Patient Care | 2 | Professional electives | 12–16 |

■ **Sample Freshman-Year Program for the Associate Degree**

First Quarter

Clinical Dental Hygiene
Dental Anatomy
Dental Hygiene
General Chemistry I
Head and Neck Anatomy
Human Anatomy and Physiology I
Radiology

Third Quarter

Clinical Dental Hygiene
Dental Hygiene
Dental Materials
Microbiology
Nutrition
Pathology

Second Quarter

Clinical Dental Hygiene
Dental Hygiene
General Chemistry II
Histology
Human Anatomy and Physiology II
Periodontology

■ Course Requirements for the Associate Degree

General

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|--|-------------|------------------------------|-------------|
| English Composition and English Literature | 8 | Foundations of Psychology | 4 |
| Chemistry | 8 | Sociology | 4 |
| Microbiology | 4 | Human Anatomy and Physiology | 10 |

Professional

| <i>Course</i> | <i>Q.H.</i> | <i>Course</i> | <i>Q.H.</i> |
|-------------------------|-------------|-----------------------------|-------------|
| Dental Anatomy | 2 | Periodontology | 2 |
| Radiology | 3 | Pharmacology | 3 |
| Dental Hygiene | 12 | Head and Neck Anatomy | 2 |
| Clinical Dental Hygiene | 23 | Dental Materials | 2 |
| Nutrition | 2 | Law and Ethics | 2 |
| Histology | 2 | Community Health Extramural | 3 |
| Pathology | 4 | Pain Control | 2 |
| Special Patient Care | 2 | | |

Alternative Freshman-Year Program (University College)

Students in the Alternative Freshman-Year Program are considered regular students and are degree candidates with an undeclared major. The Alternative Freshman-Year Program is specifically designed to help students strengthen their basic skills in writing and mathematics. While helping students gain confidence in their ability to do college-level work, the program also offers them an opportunity to consider several different areas of study before committing themselves to a specific major. Through the combination of a carefully prescribed curriculum and the attention of professional counselors, students are helped to tailor a program to fit their individual needs. These same counselors are normally available on a continuing basis throughout the entire first year.

Developed in collaboration with University College, a division of Northeastern University serving students who seek a flexible college program, the Alternative Freshman-Year Program has a proven record of success.

■ The Program

Students in the Alternative Freshman-Year Program begin with 12 to 16 quarter hours of credit in their first academic quarter. In their second and third quarters, students in most tracks accelerate their schedules to take 16 quarter hours of credit per quarter. Students in the health sciences track take 15 quarter hours in their second quarter and 17 quarter hours in their third quarter.

After completing the prescribed Alternative Freshman-Year Program and achieving a cumulative quality-point average of 1.400 or better and fulfilling specific program requirements as noted, students may continue their degree programs within University College or transfer, with sophomore status, to any program in the College of Business Administration or the College of Criminal Justice as well as certain programs in the Boston-Bouvé College of Human Development Professions and the College of Arts and Sciences. In addition to the cumulative quality-point average of 1.400 or better, the College of Business Administration requires a 1.800 average in four key courses: Mathematics for Business, Fundamentals of English II, Economics I, and Survey of Business and Management. Additional program requirements for students who would like to be admitted to sophomore status in the College of Pharmacy and Allied Health Professions are listed in the *Student Handbook* for Basic Colleges.

■ The Faculty

The University has carefully selected for the Alternative Freshman-Year Program faculty members who are aware of individual student goals and needs. Faculty and students meet in small classes of not more than 25 students.

■ Student Services

As members of the program, students are considered regular Northeastern University day students even though they have unique schedules and a distinctively tailored curriculum. Therefore, they have access to all counseling services, physical education facilities, and extracurricular programs at the University's main campus in Boston.

Alternative Freshman-Year students are encouraged to make extensive use of the Academic Assistance Center (page 217) and the Math and Writing Centers (page 55). Alternative Freshman-Year students are also frequently referred to the Learning Resources Center on the Boston campus. A third and very important resource, the Counseling and Testing Center (page 218), is available for personal and academic counseling and also for vocational testing and counseling.

■ Sample One-Year Program: Business Track

| First Quarter | | Third Quarter | |
|---|-------|---|------|
| Course | Q.H. | Course | Q.H. |
| Integrated Language Skills A | 4 | Economics I (or directed elective) [†] | 4 |
| Fundamentals of English I | 4 | History of Civilization B | 4 |
| Mathematics I* | 4 | Survey of Business and Management (or directed elective) [†] | 4 |
| History of Civilization A or Survey of Business and Management | (4) | Mathematics for Business* | 4 |
| Total Quarter Hours | 12–16 | Total Quarter Hours | 16 |
| Second Quarter | | | |
| Course | Q.H. | | |
| Integrated Language Skills B | 4 | | |
| Fundamentals of English II | 4 | | |
| Mathematics II* | 4 | | |
| History of Civilization A or Economics I or Survey of Business and Management | 4 | | |
| Total Quarter Hours | 16 | | |

*Students will be placed in one of three mathematics courses, depending on placement test results. Those receiving advanced placement have the option of completing MTH 1114 during the freshman year.

[†]All business track students will complete HST 4110 in either the fall or winter quarter. ECN 4601 and MGT 4110 may be taken in the fall, winter, or spring quarter; ECN 4601, in either the winter or spring quarter.

■ Sample One-Year Program: Arts and Sciences, Criminal Justice, or Education Track

| First Quarter | | Third Quarter | |
|--------------------------------|-------|-------------------------------------|------|
| Course | Q.H. | Course | Q.H. |
| Integrated Language Skills A | 4 | History of Civilization B | 4 |
| Fundamentals of English I | 4 | Introduction to Politics | 4 |
| Mathematics I* | 4 | Sociology II (or directed elective) | 4 |
| Sociology I | (4) | Directed elective [†] | 4 |
| Total Quarter Hours | 12–16 | Total Quarter Hours | 16 |
| Second Quarter | | | |
| Course | Q.H. | | |
| Integrated Language Skills B | 4 | | |
| Fundamentals of English II | 4 | | |
| History of Civilization A | 4 | | |
| Sociology II or Mathematics II | 4 | | |
| Total Quarter Hours | 16 | | |

*Students will be placed in one of two mathematics levels, depending on placement test results.

[†]The directed elective is to be chosen with consideration for the student's intended major or to complete upperclass requirements such as ENG 1111 or MTH 1101.

■ Sample One-Year Program: Health Sciences Track

First Quarter

| <i>Course</i> | <i>Q.H.</i> |
|----------------------------|-------------|
| Math II | 4 |
| Fundamentals of English I | 4 |
| Pre-Chemistry | 5 |
| Integrated Language Skills | 1 |
| Development I | 2 |

| | |
|---------------------|----|
| Total Quarter Hours | 15 |
|---------------------|----|

Second Quarter

| <i>Course</i> | <i>Q.H.</i> |
|-----------------------------|-------------|
| Fundamentals of Mathematics | 4 |
| General Chemistry I | 5 |
| Integrated Language Skills | |
| Development II | 2 |
| Fundamentals of English II | 4 |

| | |
|---------------------|----|
| Total Quarter Hours | 15 |
|---------------------|----|

Third Quarter

| <i>Course</i> | <i>Q.H.</i> |
|----------------------|-------------|
| Biology I | 4 |
| General Chemistry II | 5 |
| Freshman English II | 4 |
| Directed elective | 4 |

| | |
|---------------------|----|
| Total Quarter Hours | 17 |
|---------------------|----|

Fourth Quarter

| <i>Course</i> | <i>Q.H.</i> |
|------------------------|-------------|
| Biology II | 4 |
| Functions and Calculus | 4 |
| Directed elective | 4 |

| | |
|---------------------|----|
| Total Quarter Hours | 12 |
|---------------------|----|

■ Tuition and Fees

Tuition and fees are the same as for students in the Basic, or Day, Colleges. (See pages 30–34.) Payment of the standard tuition during the first three academic quarters of residence entitles students to 48 credit hours of instruction. Thus, those who take the 44 programmed credits are entitled to a four-quarter-hour tuition adjustment at the regular freshman-year rate.

Students taking the curriculum specified for the health sciences pay the standard tuition for each of their first three quarters of residence, even though the academic work required in this curriculum is distributed over four consecutive quarters. Alternative Freshman-Year students in the health sciences curriculum are not charged additional tuition for their fourth quarter in residence and do not receive a tuition adjustment.

■ Admissions

For more information on the Alternative Freshman-Year Program, or to request an application, please write the Department of Undergraduate Admissions, 39 Richards Hall, or call 617-437-2000.

ROTC, Military Officers' Education Program

The Reserve Officers' Training Corps (ROTC) program, offered by the Department of Military Science, is an adjunct to University programs. ROTC's goal is to create commissioned officers with leadership potential. The program, therefore, seeks to teach principles of personnel management and to inculcate the universal leadership traits of personal confidence, loyalty, ready acceptance of responsibility, and the desire to achieve.

Anyone wishing to contact ROTC should write to or call the Department of Military Science, 430 Parker Building, Northeastern University, Boston, MA 02115, 617-437-2372.

Army

Anthony J. Hoss, Lt. Col., U.S. Army, M.A., *Professor and Chairman,*
Department of Military Science

The Reserve Officers' Training Corps (ROTC) staff consists of active Army officers and noncommissioned officers assigned by the Department of the Army.

■ The Program

The program consists of the Basic Course (freshman and sophomore years) and the Advanced Course (middles, junior, and senior years). It does not conflict with co-op schedules.

Enrollment in the Basic Course is voluntary and is open to all full-time students who are United States citizens. Students in it do not incur a military obligation.

The Advanced Course is open to all qualified students who meet these prerequisites: completion of the Basic Course (or approved equivalent), or prior honorable military service; physical aptitude and medical requirements; and age requirements. Advanced Course students receive a \$100-per-month stipend, up to \$1,000 per year. They are also paid for the six-week advanced camp normally attended between their junior and senior years. Completion of the program can lead to a commission as a second lieutenant in either the active or reserve components of the U.S. Army.

■ Graduation Requirements

Regulations of the individual Basic Colleges prevail for ROTC graduation credit. However, students may individually petition their academic department for acceptance of certain courses for graduation credit.

■ Scholarships

The Army ROTC scholarship pays for tuition and provides an allowance for textbooks and laboratory fees, plus an additional living allowance of \$100 per month, up to \$1,000 for each year the scholarship is in effect. Selected four-year scholarship winners may also qualify for full room and board during their first year. Scholarships are available in varying lengths and cover the cadet's remaining academic years. Full-time students meeting specific requirements may apply for scholarships covering their last four, three, or two academic years. These are merit-based scholarships,

and a student's earnings during cooperative work periods do not reduce scholarship payments.

■ **Transfer Students and Veterans**

Transfer students, whether or not previously enrolled in ROTC, are welcome to join our program. They should contact the Department of Military Science concerning their options for program entry.

Honorably discharged veterans (enlisted) are a vital part of our cadet corps and will receive special consideration for ROTC entry.

■ **Uniforms and Equipment**

Uniforms are issued without cost to ROTC cadets. A \$35 deposit is required to ensure the return of the loaned property in good condition. Any loss or damage exceeding the deposit will be charged to the student.

Air Force

William R. Laurier, Col., U.S. Air Force, M.S., *Professor and Chairman,*
Department of Aerospace Studies, Boston University

The Air Force Reserve Officers' Training Corps (AFROTC) program offers students an opportunity to earn a commission in the United States Air Force. The student is commissioned as a second lieutenant upon completion of both the Aerospace Studies (AS) curriculum and the requirements for an undergraduate or graduate degree. AFROTC classes and leadership laboratories are conducted on the Boston University campus at 156 Bay State Road. For more information, telephone 617-353-4705 or write AFROTC at the campus address (Boston 02215-1796).

■ **The Programs**

Four-Year Program Northeastern University students may enter the AFROTC program as members of either a four-year or a two-year program. Participation in AFROTC by nonscholarship students during the first two years of the four-year program carries no commitment to serve in the Air Force.

Undergraduates may join the four-year AFROTC program by registering for the appropriate aerospace studies classes. Students from all academic disciplines, including five-year co-op, may register. Preferred entry is the first quarter of the first year, although students may enter as late as the first quarter of the sophomore year.

Freshman-year classes focus on the functions and organizations of the Air Force. Sophomore classes concentrate on military history with an emphasis on the use of airpower. Junior classes learn about management techniques and styles. Senior-year classes study international relations and the impact policies have on the defense establishment. Complementing the academic classes is a weekly leadership laboratory, during which students are introduced to Air Force customs, courtesies, drill, ceremonies, and lifestyles. The Air Force uniform and AFROTC books are provided to the student free of charge except for a refundable uniform deposit.

The nonflying commissioned graduate incurs a four-year active duty service commitment. Navigators incur a six-year post-training commitment, and pilots incur a ten-year post-training commitment.

Two-Year Program Students unable to participate in the four-year AFROTC program are eligible for the two-year program. Prerequisites for entry into the two-year

program include at least six remaining academic quarters of undergraduate or graduate study, meeting Air Force physical standards, good moral character, and successful completion of six weeks of field training. Applications for the two-year program require several months for processing. Prospective two-year program members should contact the University AFROTC detachment no later than December of the sophomore year.

■ Graduation Requirements

Regulations of the individual Basic Colleges prevail for ROTC graduation credit. However, students may individually petition their academic department for acceptance of certain courses for graduation credit.

■ Scholarships

Two programs are available: the Four-Year Scholarship Program and the College Scholarship Program. High school seniors may apply for the Four-Year Scholarship Program after May 1 of their junior-senior summer through a local Air Force Recruiter. Deadline for the completed package is December 1. The College Scholarship Program is available to freshmen and sophomore students. To be eligible for 3½-, 3-, 2½-, or 2-year scholarships, students must attend AFROTC classes in the fall quarter of their freshman year. Students who are unable to attend AFROTC in the fall quarter, freshman year are eligible for two-year scholarships. For more information, contact the Department of Aerospace Studies, Boston University, 156 Bay State Road, Boston, MA 02215, (617) 353-4705.

Navy

Michael E. Field, Captain, U.S. Navy, M.A., *Professor and Chairman*
Department of Naval Science, Boston University

The Naval Reserve Officers Training Corps (NROTC) programs, through instruction in various subjects in naval science and exposure to operating elements of the Navy and Marine Corps, provide a number of opportunities leading to a commission as an officer in either of these services. Upon completion of both the Northeastern University and the NROTC requirements, newly commissioned officers will have the opportunity to serve aboard combatant ships, with the nuclear submarine force, as pilots or flight officers in naval aviation, or with the Marine Corps.

Anyone wishing to contact NROTC should write to or call the office of the Commanding Officer, NROTC Unit, Boston University, 116 Bay State Road, Boston, MA 02215-1796, 617-353-4232/2535.

■ The Programs

NROTC students at Northeastern may enroll in the crosstown program with the Department of Naval Science at Boston University. NROTC has two basic programs, the Scholarship Program (see Scholarships, below) and the College program. The College Program provides students with naval science texts, uniforms, and a \$100 per month stipend during the last two academic years. Full-tuition scholarships may be awarded to selected applicants who have been active in the College Program for at least one semester. Applications for the College Program are made through the Department of Naval Science at Boston University.

Five-Year Co-op Students on a five-year co-op program may accept and use a Navy scholarship. Tuition is paid during those quarters when the student is actually in classes at Northeastern, and progression through the program of naval science courses is determined by completion of academic and professional requirements.

All NROTC programs require some professional training, depending on the program and the time of entry. This training occurs during the cruises with the operating forces of the Navy or Marine Corps. Normally, there are three cruises of four to six weeks each for scholarship students, and one cruise of four to six weeks for College Program students.

Two-Year Program In addition, there exists a two-year NROTC program for sophomores/middlers who did not join NROTC by the start of their sophomore year. These students are sent to a six-week Navy summer school in Newport, Rhode Island, at full midshipman's pay and allowances, to catch up in the naval science courses. Both Scholarship and College Program options are available; selection for this program takes place in the spring, and all applications must be submitted by late February of the sophomore year.

■ Eligibility Requirements

To be eligible for the Naval ROTC program, students must be all of these:

- a citizen of the United States;
- at least 17 years old and not more than 25 years old (27½ for College Program) by June 30 of the calendar year in which graduation and commissioning are anticipated. Applicants who have prior active duty military service may be eligible for age waivers up to a maximum of 48 months.
- physically qualified in accordance with the standards for entrance;
- enrolled in a program leading to a baccalaureate degree.

■ Graduation Requirements

Regulations of the individual Basic Colleges prevail for ROTC graduation credit. However, students may individually petition their academic department for acceptance of certain courses for graduation credit.

Upon graduation and completion of NROTC requirements, Scholarship students will be obligated to serve on active duty for four years, College Program students for three years. Students accepted for flight training will be required to serve on active duty for eight years following completion of flight school.

■ Course Requirements

The NROTC program of instruction encompasses the science of nautical matters and principles of leadership, both of which are vital to the art of being a naval or Marine officer. The program has three interactive and equally important aspects. The first consists of the academic major with subjects taught by the University. These subjects must include two quarters each of a modern Indo-European language and computer science; three quarters each of calculus and physics (for the Scholarship Program) or college math and physical science (non-Scholarship Program); three quarters of English composition; and American military history/national security policy. The second aspect consists of the professional academic subjects taught by the Department of Naval Science. The third aspect consists of leadership laboratories (two hours a week during the school year), indoctrination tours conducted at Navy/Marine Corps facilities, and cruises aboard Navy ships.

All students in the NROTC program must take the following naval science courses prior to graduation:

Introduction to Naval Science
Naval Ships Systems I
Naval Ships Systems II
Seapower and Maritime Affairs*
Navigation and Naval Operations I and II (Navy option only)
Modern Warfare (Marine option only)
Leadership and Management I and II (Navy option only)*
Amphibious Warfare (Marine option only)*

*Certain Northeastern courses may be substituted for these naval science courses.

These courses are taught by NROTC staff officers at Boston University. Northeastern NROTC students attend classes with midshipmen from Boston University and Boston College. Naval science classes are offered in the fall and winter quarters only.

■ Scholarships

The Scholarship Program provides full tuition, books and fees, and a \$100 per month stipend for four or two years of instruction at Northeastern University. These scholarships are granted as a result of annual nationwide competition.

■ Admissions

Students should visit or call the Boston University Naval Science Department Office prior to registration day to initiate application procedures. Students beyond the first quarter of the freshman year, or simply those with questions should contact the office of the Commanding Officer. All inquiries will receive immediate attention.

Basic College Compensatory Programs

Basic College Compensatory Programs in mathematics and English are for freshmen native speakers of English whose reading, writing, or mathematical skills need to be strengthened. (Non-native speakers should see page 18 for information about the English-as-a-Second-Language Proficiency Requirement.)

The University uses one or more of three criteria to determine which freshmen participate in the compensatory programs: precollege academic credentials, tests administered during orientation week, or performance in Freshman English I (ENG 1110).

In general, the program consists of six courses, each offering four hours of credit. The courses must fit into the sequences below.

Fall*

| | |
|---------|------------------------------|
| MTH1000 | Mathematical Preliminaries I |
| ENG1110 | Freshman English I† |
| or | |
| ENG1013 | Fundamentals of English I |
| ED1003 | Reading/Study Skills |

Winter*

| | |
|----------|-------------------------------|
| MTH 1010 | Mathematical Preliminaries II |
| ENG 1014 | Intensive Writing |

Special Note Successful completion of Mathematical Preliminaries I and II is a prerequisite for:

| | |
|---|-----------------------------------|
| MTH 1101, MTH 1106, MTH 1107, and MTH 1108 | Non-business mathematics sequence |
| MTH 1113 and MTH 1114 | Business mathematics sequence |

Special Note A passing letter grade in Freshman English I or Intensive Writing is a prerequisite for:

| | |
|-------------------|---------------------------------|
| ENG 1111 | Freshman English II |
| ENG 1111-ENG 1113 | Engineering sequence |
| ENG 1111-ENG 1114 | Engineering Technology sequence |

*The same sequence is offered winter/spring for students who enter in January.

†Students whose work in this course is unacceptable for success in Freshman English II (ENG 1111) will receive a grade of S and must complete Intensive Writing (ENG 1014).

■ Compensatory Programming in the Basic Colleges

Acceptance for credit is determined by the faculties of the individual colleges and is therefore subject to change. The chart below outlines the Basic Colleges' policies on compensatory courses.

| | English 1 (ENG 1110/ 1013*) | English 2 (ENG 1014) | Mathematical Preliminaries 1* (MTH 1000) | Mathematical Preliminaries 2* (MTH 1010) | Reading/ Study Skills (ED 1003) |
|---|-----------------------------------|-------------------------|--|--|---------------------------------------|
| <i>Arts and Sciences</i> | yes | yes | yes | yes | yes |
| <i>Bouvé: Physical Therapy</i> | yes | yes | no | no | no |
| <i>Bouvé: Physical Education</i> | yes | yes | yes | yes | yes |
| <i>Bouvé: Recreation and Leisure Studies</i> | yes | yes | no | no | no |
| <i>Bouvé: Teacher Preparation</i> | yes | yes | yes | yes | yes |
| <i>Business Administration</i> | yes | yes | yes | yes | no |
| <i>Computer Science[†]</i> | n/a | n/a | n/a | n/a | n/a |
| <i>Criminal Justice</i> | yes | yes | yes [‡] | yes [‡] | yes |
| <i>Engineering[†]</i> | n/a | n/a | n/a | n/a | n/a |
| <i>Engineering Technology</i> | yes | yes | n/a | n/a | n/a |
| <i>Nursing</i> | yes | yes | no | no | no |
| <i>Pharmacy and Allied Health Professions</i> | yes, but w/o credit§ | yes | no | no | no |

*Asterisked courses are graded pass/fail and therefore are not included in the student's quality-point average. A *yes* designates acceptance for credit, a *no* nonacceptance, and an *n/a* not applicable.

[†]This college offers MTH 1120 and MTH 1121, a course sequence in college calculus with algebra and trigonometry, to students who test deficient in mathematics. The sequence involves extra work in algebra and trigonometry and covers the same material as the regular freshman calculus sequences and prepares them for standard Calculus III.

[‡]Students in Criminal Justice whose diagnostic examinations suggest a need for basic mathematics and who wish to satisfy their mathematics/science elective requirements may elect MTH 1000 or MTH 1010 to prepare for college-level mathematics courses.

§This college will accept for credit only ENG 1110 or ENG 1014 (with a letter grade). Students who complete these English courses must still take a four-credit English elective.

Radiologic Technology Program (University College)

The radiologic technologist is an important member of any health-care team. Combining a technical background with extensive training and skills, the radiologic technologist is trained to use X-rays to produce a clear picture or radiograph of a patient's tissue, bone, or organ structure for evaluation and interpretation by a physician.

■ Professional Preparation

The Radiologic Technology Program is designed to offer students the opportunity to prepare for entry-level employment opportunities as radiologic technologists. Some graduates seek career opportunities in the diagnostic environments of clinics and hospitals. Others explore opportunities for employment in production and quality control in industrial firms. Graduates may also consider a program in radiation therapy, nuclear medicine, or ultrasound technology, or choose to continue their education by applying for acceptance to a bachelor's degree program in health science or health management.

■ The Program

The Radiologic Technology Program offers a combination of academic preparation and clinical experience. Enrolling a new class of students in September of each year, the program consists of lecture and laboratory sessions held at Northeastern and periods of clinical training at selected radiology departments in Massachusetts hospitals. The program requires 27 months of continuous study. A two-week orientation period is held prior to the beginning of classes each September.

■ Accreditation

This program is accredited by the Committee on Allied Health Education and Accreditation of the American Medical Association and by the Joint Review Committee on Education in Radiologic Technology.

■ Certification

Upon satisfactory completion of the program, students receive an associate in science degree and are eligible to sit for the American Registry Examination for certification as radiologic technologists.

■ Admissions

For more information regarding the program, or to request an application for admission, contact the Radiologic Technology Program, Northeastern University, 266 Ryder Hall, Boston, MA 02115, 617-437-2818.

Part-Time Programs at Northeastern



University College

University College is the part-time undergraduate division of Northeastern University and a long-time leader in educational programs for adults. The college's programs are constantly evaluated and updated to satisfy the changing professional, cultural, and social needs and interests of adults.

■ The Programs

Undergraduate degree programs have been developed in over 30 major fields of study within business administration, criminal justice and security, the health professions and sciences, and the liberal arts. Courses are offered on a convenient, part-time basis throughout the week: during the evening, early in the morning, and on weekends. Students may take single courses, pursue a certificate program, or enroll in full degree programs leading to the associate's or bachelor's degree. Short-term seminars are also offered for credit. Classes are scheduled at 16 accessible campuses.

The B.E.T. Degree The School of Engineering offers six- and seven-year part-time curricula leading to the degree of Bachelor of Engineering Technology in the following areas:

- aerospace maintenance engineering technology (transfer);
- computer technology;
- mechanical engineering technology;
- mechanical-structural engineering technology;
- electrical engineering technology.

Classes are held either in the evenings or on Saturdays. The evening classes generally meet two times per week. For more information on admission to these programs, contact the School of Engineering Technology, 120 Snell Engineering Center.

■ Academic Advisers

Academic advisers are available by appointment to talk with students about courses, transfer credit, degree requirements, and other matters of individual concern. University College advisers are present at the Boston and Burlington campuses weekdays, by appointment. To arrange for an appointment at a specific campus, please telephone the appropriate number below:

Telephone Numbers and Hours

| | |
|----------------------------|---|
| Main Boston campus | 617-437-2400 (voice) 617-437-2825 (TTY) 8:30 A.M.–7:00 P.M. |
| Burlington campus | 617-272-5500 8:30 A.M.–4:30 P.M. |
| Downtown Boston campus | 617-367-6373 8:30 A.M.–4:30 P.M. |
| All other branch locations | 617-437-5544 8:30 A.M.–7:00 P.M. |

During registration, the advisers at Boston are available on a walk-in basis or to answer questions by phone from 9:00 A.M. to 7:00 P.M. Advisers at all campuses explain registration procedures and will advise students on course selection. There is no charge for these services.

University College also offers a variety of career and other support services, including a career-development course, job-search seminars, and counseling, testing, and placement services. For a copy of the current *University College Bulletin*, call the main campus number listed above or write to the University College, Ryder Hall, 360 Huntington Avenue, Boston, MA 02115.

School of Engineering Technology

In addition to the full-time curricula described in this bulletin, the School of Engineering Technology offers interdisciplinary programs providing technological and professional development opportunities to meet special needs of the part-time student. These programs provide educational opportunities for students who must pursue full-time employment but who desire to initiate or continue their academic work.

The part-time program includes pretechnology preparatory courses and degree programs leading to the Associate in Engineering (A.E.), the Associate in Science (A.S.), and the Bachelor of Engineering Technology (B.E.T.). The A.E. degree may be

earned in computer technology and in architectural, environmental, structural, surveying and highway, electrical, and mechanical engineering technology. The A.S. degree may be earned in telecommunications and energy systems. Students seeking further education may earn the B.E.T. degree in computer technology and in mechanical, electrical, mechanical-structural and manufacturing engineering technology.

School of Engineering Technology advisers are available at 120 Snell Engineering Center Monday through Thursday from 8:30 A.M. to 8:00 P.M., Friday from 8:30 A.M. to 5:30 P.M., and Saturday from 8:00 A.M. to 2:00 P.M.

For a copy of the current School of Engineering Technology bulletin or more information, please write Northeastern University, School of Engineering Technology, 120 Snell Engineering Center, Boston, MA 02115; or call 617-437-2500 (voice), 617-437-2852 (TTY), or 617-437-2501 (FAX).

Division of Continuing Education

Northeastern University established continuing education programs more than 25 years ago to provide a practical, high-quality career-related education in business and industry consistent with the University's tradition of adult education. The mission of the division is to be a leader in nondegree continuing education for the career professional. Courses are taught primarily by practitioners in their respective fields. Program development, courses, and seminars are based on market needs and wants and are offered at convenient off-campus locations and at company sites. Through the use of such technological advances as microwave and satellite transmission, the division enhances the University's regional and national reputation as a leader in continuing education. For more information on the programs below, telephone the division office at 617-437-5828.

Building and Construction Technology Program For a broad spectrum of professionals either in or considering some aspect of the building technologies, these courses range from introductory to advanced and are conducted in an intensive, total-immersion setting. Evening courses, on-site training, and seminars include architecture, landscape management, building inspection, construction technology, construction law and management, fire protection, land surveying, engineer-in-training license examination preparation, and Massachusetts Electrician's Code review. Certificate programs are offered in HVAC systems design, environmental management, project management, facilities management, construction superintendency, building inspection, building and construction technology, and real estate development. For more information, telephone 617-320-8026.

Insurance and Financial Services Institute Established to foster excellence in the insurance and financial services communities in the Boston area, the institute offers courses and seminars in general insurance, risk management, insurance licensing, and financial services. These study programs assist those seeking to develop or to update professional credentials. For more information, telephone 508-533-5101.

Network Northeastern Developed to serve the need of the high-technology community for flexible educational and training programs, Network Northeastern broadcasts from the University campus directly to company sites and to the Burlington and Dedham campuses. Live classroom instruction is telecast in color to these sites, where it is viewed in reception rooms equipped with television monitors and a telephone talk-back system. Videotapes of missed classes are provided, and a courier service delivers and collects homework assignments and serves as a link to the registrar, bookstore, and other University services.

Network Northeastern offers courses in graduate engineering, computer science, undergraduate engineering technology, the State-of-the-Art Program, and graphic arts. In 1987, Northeastern became the first university in eastern Massachusetts to install a Ku-band satellite dish. This enables the University to broadcast courses throughout the continental United States and to redistribute live satellite programs to subscribing company sites via the microwave system. Via the satellite, the Network is a local distributor for Institute of Electrical and Electronics Engineers (IEEE) video-conferences and other satellite providers. For more information on Network services, telephone 617-437-5620.

Paralegal Program This program offers the 12-week Paralegal Certification program and specialist workshops on specific legal topics such as legal research/writing, real estate, family law, litigation, and labor law. For information, telephone 617-320-8047.

State-of-the-Art Program The State-of-the-Art Program offers evening courses, seminars, and on-site training designed for working professionals seeking practical, hands-on education in a job-related area of technology. The curriculum includes: AI/expert systems, high-level computer languages, biotechnology, microwave engineering technology, artificial intelligence, and certificate programs in information transport systems, computerized automation technology, VLSI design, microelectronics/semiconductor science, software engineering, and technology management. For more information, telephone the State-of-the-Art Program at 617-320-8000.

Test Preparation Program The Test Preparation Program offers courses to help prepare for the LSAT, GMAT, and GRE examinations, providing the participant with an in-depth exposure to the subject matter. For more information, telephone 617-320-8047.

Urban Mass Transit Program The Urban Mass Transit Program is designed to develop improved methods of meeting unique challenges facing management in the urban mass transportation industry. The goal of the program is practical education in modern management theory and practice. For more information, call 617-320-8000.

Graduate and Professional Schools at Northeastern

The following graduate and professional schools of the University offer both day and evening degree programs.

■ Arts and Sciences

The master of arts degree may be earned in applied behavior analysis, economics, English, history, journalism, political science, sociology, social anthropology, and writing. The master of science degree is available in biology; chemistry; economic policy and planning; law, policy, and society (interdisciplinary program); mathematics; and physics. The Master of Science in Health Science, the Master of Journalism (in news media management), the Master of Public Administration, and the Master of Technical and Professional Writing degrees are also offered. In addition, students may earn the certificate of advanced graduate study in literary study. The doctor of philosophy degree is available in biology; chemistry; economics; law, policy, and society (interdisciplinary program); mathematics; physics; psychology; and sociology. An interdisciplinary master of science degree program in medical laboratory science with a concentration in clinical chemistry is also available. Nondegree certificate programs are also available in technical writing, and writing. Most programs may be completed through either full- or part-time study.

■ Boston-Bouvé College of Human Development Professions

The master of science degree may be earned with specialization in counseling psychology, human resource counseling, rehabilitation counseling, clinical exercise physiology, speech-language pathology and audiology, or recreation, sport, and fitness management. Programs may be completed through full- or part-time study.

The master of education degree may be earned with specialization in consulting teacher of reading, curriculum and instruction, educational research, human development, special education, school counseling, school adjustment counseling, and college student personnel counseling. The certificate of advanced graduate study is offered in the areas of counseling psychology, human services specialist, school psychology, and rehabilitation counseling. The doctor of education degree may be earned in counseling psychology.

■ Business Administration

A master of business administration degree may be earned through any one of five M.B.A. programs. The Graduate School of Business Administration offers a variety of programs to meet the needs and schedules of graduate business students. Two full-time program alternatives are offered: the 21-month Cooperative Education M.B.A. Program, which includes a six-month, paid professional work assignment; or the two-year, traditional full-time M.B.A. program, which may include administrative, research, or teaching assistantship opportunities. Individuals who wish to continue their full-time job responsibilities while earning an M.B.A. degree may consider the evening part-time M.B.A. program of study, the 18-month Executive M.B.A. Program for upper-level managers, or the accelerated part-time High-Technology M.B.A. Program for qualified technical professionals.

In addition, for individuals who already hold M.B.A. degrees, there is a nondegree program for advanced study in business administration leading to the Certificate of Advanced Study in Business Administration.

Center for Management Development The College of Business Administration sponsors the Center for Management Development, which provides opportunities for professional growth for middle and senior-level managers. The programs, scheduled throughout the academic year, include the Executive Development Program, the Management Workshops, and custom-designed programs. Participants are sponsored by their employers. The Executive Development Program is a graduate-level course for managers who have had responsibility for a major task, function, department, division, or independent enterprise. The Management Workshops offer middle-level managers comprehensive study in major areas of business through two different graduate-level programs. The center also designs and conducts special programs for a wide range of business organizations. For information, telephone 617-437-3272.

■ **Computer Science**

The College of Computer Science offers both full- and part-time programs leading to M.S. and Ph.D. degrees in computer science. Students may specialize in theory, databases, artificial intelligence, languages, operating systems, or networks.

■ **Criminal Justice**

The College of Criminal Justice offers both full- and part-time programs leading to a degree of Master of Science in Criminal Justice. Students enrolled in the master of science program in criminal justice may choose from among several areas of specialization: administration and planning; criminology and research; security administration; and a multidisciplinary concentration developed with a faculty member to suit the individual's needs.

■ **Engineering**

The master of science degree may be earned, with specification in the field of chemical engineering, civil engineering, computer systems engineering, electrical engineering, industrial engineering, engineering management, information systems, or mechanical engineering. A special five-year honors program in mechanical, industrial, or electrical engineering is offered, leading to both bachelor's and master's degrees; the professional engineer degree in mechanical, industrial, or electrical engineering; the doctor of engineering degree in chemical engineering; and the Ph.D. degree in chemical, civil, electrical, industrial, or mechanical engineering.

■ **Law**

The School of Law offers a full-time program of professional instruction leading to the degree of Juris Doctor (J.D.). It is fully accredited by the American Bar Association and is a member of the Association of American Law Schools. There are no courses for part-time or evening students.

Unique among American law schools, Northeastern's School of Law features cooperative legal education. Under this plan, each student works full-time at law for participating employers for four calendar quarters during his or her second and third years, alternating with equal periods of full-time course work. This blending of academic study and practical legal work experience, after a traditional first year of intensive academic study, is designed to offer the best possible preparation for the actual practice of law. Cooperating employers include large and small private firms, government agencies, legal assistance and public defender organizations, judges,

unions, corporate law departments, and virtually every type of legal practitioner. Employers are located nationwide.

Because the school operates 12 months a year, students complete the program on the same schedule as do those in more traditional law schools.

■ **Nursing**

The Graduate School of Nursing offers a master of science degree with specialization in administration, community health, critical care, primary care, and psychiatric-mental health nursing. The 52 quarter-hour curriculum is designed so that students may pursue either full-time or part-time study. Full-time students may expect to complete the degree requirements in one calendar year. The master's program helps to prepare students for advanced nursing practice as clinical specialists, managers, and educators.

The Certificate of Advanced Graduate Study is offered in administration, community health, critical care, primary care, and psychiatric-mental health nursing for those who already hold an M.S. degree in nursing.

■ **Pharmacy and Allied Health Professions**

The master of science degree is offered on a part-time and full-time basis in biomedical science, hospital pharmacy, medical laboratory science, medicinal chemistry, pharmaceuticals, toxicology, and pharmacology. The Master of Health Professions is also offered with the following options: general, health policy, physician assistant, and regulatory toxicology. The Ph.D. degree is offered in biomedical science with specialization in medical laboratory science, medicinal chemistry, pharmaceuticals, pharmacology, and toxicology. The clinically oriented Doctor of Pharmacy (Pharm.D.) is offered as a full-time program to graduates of accredited colleges of pharmacy. Five nondegree options are also available, with certificates in health record administration, medical technology, perfusion technology, physician assistant, and respiratory therapy.

■ **Professional Accounting**

The Graduate School of Professional Accounting is specifically designed for the Arts and Sciences undergraduate interested in a comprehensive business education and an entry to the financial community. It is a 15-month program in which students are assigned to a paid internship with an international CPA firm as part of their curriculum. Graduates of the program have had a nearly 100 percent placement rate, unparalleled success on the CPA exam, and have gone on to become presidents and chief financial officers of major corporations, as well as partners in the accounting profession.

Academic Research



Research is vital to a college education. Through research, faculty members and students stay abreast of developments in their particular fields. Faculty who disseminate this knowledge through publishing, speaking, and teaching help ensure that students receive a first-rate university education.

At Northeastern, research and scholarly endeavors are actively encouraged. Each year, the faculty receive funding for an ever-increasing number of research projects. Sponsorship comes from a variety of sources, including federal agencies, private industry and foundations, and the University itself.

While much of this research is carried out by faculty members, graduate students, and research associates, ample opportunities exist for undergraduate students. Research participation can be included as part of regular academic programs, as independent studies, or as cooperative work assignments. Research activities are limited only by the student's motivation, curiosity, and creativity.

Northeastern University has numerous distinguished faculty members, many of whom have received prestigious awards, including Sloan Scholarships, Guggenheim Fellowships, and National Institutes of Health Research Career Awards. Faculty members lecture the world over.

Many faculty also serve as consultants to government, business, and industry and participate on a variety of national and international committees. At the same time, Northeastern considers education its primary mission, and students will always find an enthusiastic and accessible faculty to answer questions, solve problems, and stimulate inquiring minds.

Current research spans almost every academic and professional field and is not limited to laboratory investigations or the hard sciences. Every department of every college at Northeastern carries out some basic or applied research projects.

A brief summary of some of the topics currently under investigation by faculty and students follows. Students desiring to explore the opportunities for research participation should inquire at the appropriate departmental offices.

■ **Arts and Sciences**

In the College of Arts and Sciences, research projects reflect the diversity of the college's 19 departments. Research in the arts, the humanities, and the natural and social sciences includes such diverse topics as Chinese social sciences, plant molecular biology, nature in twentieth-century American poetry, visual attention and color vision, electromagnetism, human capital, optical emission spectroscopy, and the impact of the social policy of deinstitutionalization on children's services, to name just a few. The college's interdisciplinary interest in marine sciences is represented by the Marine Science Center, where faculty and graduate students conduct research in marine biology, botany, ecology, chemistry, and geology.

■ **Boston-Bouvé**

Research in the Boston-Bouvé College of Human Development Professions is broad in range and diverse in approach. Often a focus in research is the role of the teacher and the clinician in facilitating changes in human development. Some current research interests include the communication abilities of normal and hearing-impaired individuals, the role of exercise in cardiovascular health and disease, the evaluation of educational practices in the schools, an examination of interdisciplinary approaches to services for the elderly, and an investigation of rehabilitation services for the handicapped in industry.

■ **Business Administration**

Research in the College of Business Administration is partitioned between the theoretical and practical aspects of accounting, finance, management science, general management, human resources, and marketing. New approaches in corporate practice and academic theory are being realized through conclusions reached by a faculty examining such topics as high-technology management, small-business entrepreneurship, and foreign investment in developing countries. Other studies concentrate on transportation problems in the United States, government regulation in industry, and technological forecasting in the high-technology industry. Significant work is also being done by the marketing faculty in the area of survey research.

■ **Computer Science**

Northeastern University's College of Computer Science represents one of today's most active technological fields. Research interests of the faculty include artificial intelligence (including expert systems, connectionist models, and pattern recogni-

tion), theory (including cryptography, complexity, and analysis of algorithms), programming languages and systems, and graphics and image processing. Also of interest are a variety of interdisciplinary studies: AI and law, medicine, and business; VLSI; and studies with psychology and linguistics.

■ **Criminal Justice**

The College of Criminal Justice stresses both theoretical and applied research. Lawyers, statisticians, social and behavioral scientists, and systems specialists all serve on the faculty and participate in numerous research activities. Some research directions currently pursued by faculty include juvenile delinquency, contemporary police systems, private security, terrorism, legal studies, and crime victims.

■ **Engineering**

Research in the College of Engineering encompasses some of today's most important technological subjects. Robotics, telecommunications, signal processing, electromagnetics, materials, and theoretical aspects of computer engineering and computer-aided design are some of the major fields of interest within the college. Not all studies are high-technology oriented. Indeed, faculty pursue projects that range from the study of the electrical properties of human blood vessels to the development of methods for treating toxic waste waters. These seemingly diverse research areas do have one thing in common: they attempt to improve the quality of life.

■ **Law**

The School of Law's research activities concentrate on an investigation of the operation and impact of the legal system from a variety of interdisciplinary perspectives—including those of the historian, the economist, the social theorist, and the political scientist. Other research focuses on current legal issues, the problems of communicating lawyering skills, and the theory and practice of supervision.

■ **Nursing**

Research interests in the College of Nursing are directed toward clinical problems, the student population, and the community at large. Other significant interests include cooperative education, issues affecting women (locally, nationally, internationally), the elderly, the development of leadership skills in nurses who are employed in middle-management positions, and adaptation to chronic illness.

■ **Pharmacy and Allied Health Professions**

Research objectives in the College of Pharmacy and Allied Health Professions have important ramifications for the nation's health. Studies include new ways to analyze antidepressant and anticonvulsant drugs, the study of the pharmacology of benzodiazepine tolerance and dependence, the monitoring of electrophysiological responses of neurons, the development of resistance to drugs and metals by bacteria, the detection of bacteria and viruses in ocean waters, the development of new antihypertensive drug therapies, the development of novel drug delivery systems, and the design of protocols to improve the survival of organ transplants. Other studies include a study of current health policy laws and regulations, theoretical and practical aspects of health information management, and job and role delineation. Among the sponsors of the college's work are the National Institutes of Health, the Office of Naval Research, Eli Lilly Co., the American Heart Association, and the American Diabetes Association.

■ Research Centers and Institutes

Northeastern has several interdisciplinary centers and institutes that do not grant degrees but engage in a variety of research studies in close collaboration with academic departments. Support services for research are provided by the University's Division of Research Management, the Division of Academic Computing, and the Division of Laboratory Animal Medicine, and through the collections, reference, and online search services of the University libraries.

Barnett Institute of Chemical Analysis and Materials Science The Barnett Institute of Chemical Analysis and Materials Science is concerned with basic research in analytical chemistry and materials science and with applications to problems of social relevance. The institute has developed an international reputation in the fields of separation science, mass spectrometry, amorphous metals, and biochemical analysis. For more information about the institute, contact Dr. Barry L. Karger, director and professor of chemistry, at 617-437-2826.

Center for Applied Social Research The Center for Applied Social Research deals with issues of public policy and social research on an interdisciplinary basis. Projects are currently under way in the fields of criminal justice, public safety, social welfare, and education. For more information about the center, contact the director, Glenn L. Pierce, at 617-437-3310.

Center for Asian Studies The Center for Asian Studies was established to encourage, develop, and promote teaching and research on Asian life, and to promote the educational and cultural exchange of students and scholars. The center develops and supports multidisciplinary academic programs, courses, and research on individual Asian countries, the region as a whole, or specific issues applicable to Asian life, such as Asian political processes or family life in Japan. It supports scholarly research, faculty, and visiting scholars; coordination of graduate and undergraduate courses to develop academic and professional interest; and acquisition, publication, and dissemination of research findings on topics selected to advance scholarship and knowledge about Asia. The center also encourages and sponsors seminars, symposia, and conferences on related issues. For more information about the center, contact Dr. Holly M. Carter, director and associate professor of African-American studies, at 617-437-4153.

Center for Cooperative Education The Center for Cooperative Education helps numerous organizations explore the concept of cooperative education, implement new programs, or expand and improve existing programs. Throughout the year, it offers short-term training programs for both new and experienced coordinators of co-op programs, and it provides technical assistance to and conducts evaluations of cooperative education programs for both educational institutions and employers. The center also handles special projects for the Division of Cooperative Education and other University organizations. Since 1966, the center has trained more cooperative education personnel in the U.S. and Canada than any other organization. For more information about the center, contact Dr. Joseph E. Barbeau, director, at 617-437-3463.

Center for Digital Signal Processing The Center for Digital Signal Processing addresses state-of-the-art hardware and software systems designed to encode, decode, and extract sophisticated information from data originating from a wide variety of applications ranging from radar to electrocardiograms. For more information about the center, contact Dr. Chrysostomos A. Nikias, director and professor of electrical and computer engineering, at 617-437-3352.

Center for Electromagnetics Research The Center for Electromagnetics Research, a National Science Foundation-sponsored cooperative research center, is concerned with advanced training research in such areas as radio-frequency and electrical-discharge phenomena, electro-optics, plasmas, materials, integrated circuits, and computers that are of importance to the electronics and aerospace industries. The center's activities are supported by the federal government and industrial sponsors. For more information about the center, contact Dr. Michael B. Silevitch, director and professor of electrical and computer engineering, at 617-437-5110.

Center for Labor Market Studies Research in the Center for Labor Market Studies is concerned with a wide variety of employment, training, welfare, and human resource issues. The center is recognized as an important regional and national resource for information about educational practices and employment patterns. For more information about the center, contact Andrew M. Sum, director and professor of economics, at 617-437-2242.

Center for the Strategic Management of Technology The Center for the Strategic Management of Technology is dedicated to the exploration of expert systems in the factory-of-the-future concept in manufacturing. A total systems approach is applied that integrates the manufacturing, information, management, and control processes. For more information about the center, contact Dr. Kathleen F. Curley, director and professor of management science, at 617-437-5052.

Cooperative Education Research Center The Cooperative Education Research Center was established to perform research in cooperative education and to respond to the information needs of the co-op community across the country. To fulfill these objectives, numerous studies are under way, and the center maintains a large database of current information about co-op programs and serves as a clearinghouse of publications about co-op. For more information about the center, contact Dr. Joseph E. Barbeau, director and dean of career development, at 617-437-3780.

Electron Microscopy Center The Electron Microscopy Center has up-to-date scientific equipment to support training and research activities in cellular and subcellular structures. For more information about the center, contact Dr. Daniel C. Scheirer, director and professor of biology, at 617-437-2256.

Marine Science Center The Marine Science Center, located in Nahant, Massachusetts, is the only marine station with a year-round research and teaching facility located on the New England coast north of Cape Cod. The projects carried out there focus on marine ecology, behavior, neurobiology, structural biology, biochemistry, and molecular biology. Its exposed, rocky shore provides a living laboratory for the study of marine animals. For more information about the center, contact Dr. Kenneth B. Sebens, director and professor of biology, at 617-581-7370.

Resources and Support Services

Resources and Support Services at Northeastern



University Libraries

Alan R. Benenfeld, M.S., *Dean and Director*

Together, the collections, services, staff, and facilities of the Northeastern University Libraries provide access to information and an understanding of the organization of the literature and other information resources of the academic disciplines. The library is integral to the academic and research processes, whether these occur in a formal classroom, seminar, or laboratory setting or through individual study and enrichment.

■ Libraries

The University Libraries include four facilities. On the Boston campus is the newly constructed main library, housing the materials that support the University's programs in the humanities, sciences, social sciences, fine arts, education, computer science, engineering, criminal justice, nursing, pharmacy and allied health, and business. In addition, three libraries support the academic programs at the Burlington and Dedham campuses and at the Marine Science Center in Nahant.

The main library for the Boston campus opened in 1990. At 240,000 square feet, it is the largest academic library building in Boston. A five-level structure with 2,700 seats and shelving for more than 1.25 million volumes, it triples previous library capacities for both seating and on-site collection accessibility. The facility houses the latest online, telecommunication, and media technologies.

■ Collections

The total holdings of the University libraries include more than 620,000 volumes, 1,450,000 microforms, current subscriptions to over 6,500 serials and newspapers, and 15,000 audiovisual and computer software titles. There is a large reference collection in the main library as well as reference materials in each of the satellite campus libraries. The collections also include materials such as technical reports, musical scores, maps, government documents, and CD-ROM optical disk databases. CD-ROM databases allow rapid searching of text sources, such as indexes to journal articles and research reports, and of data resources such as in finance.

The main library is a federal depository with more than 250,000 government documents, reports, and other publications made available through the U.S. Government Printing Office. It specializes in collecting publications of the U.S. Congress, census materials, Justice Department documents, business and economics publications of the Commerce Department, and the reports of independent and Presidential commissions. The library also collects United Nations and UNESCO documents and, increasingly, state and local documents.

The André F. Favat Center, now part of the main library, has a fine children's literature collection and curriculum development materials for elementary and secondary school education.

The Media Center houses an extensive collection of computer software and self-paced audiovisual materials. Facilities are provided for viewing videodiscs, videotapes, and interactive video, and for listening to records, audiotapes, and compact discs. A language laboratory supports the study of modern foreign languages and of English as a second language. The center also has a computer that translates the printed page into the spoken word for the visually impaired, and several talking-book machines.

The University Archives serves as a repository for the historical records of the University. The collection also includes faculty publications, student yearbooks, Northeastern dissertations and theses, and other University publications.

■ Services

Library staff are available in all service areas to assist students in identifying, retrieving and using the resources in the University Libraries.

The library is introducing an online system that automates many of its services and operations. An online catalog of most of the library's holdings is linked with an online circulation system so that the display shows whether a particular book is currently charged out from the library. The online catalog will also show titles that are on order. Catalog terminals are located on all floors of the new building as well as in each satellite campus library, and staff are available to provide assistance in using the system. The online catalog is also accessible through the University's academic computer network. Any user who has access to this network from an office, laboratory, or dormitory on campus, or—through dial-in capability—from an off-campus residence, is able to search the online catalog.

In each unit of the University Libraries, librarians provide reference assistance. Librarians also provide instruction to groups and to individuals on the bibliographic research process and on strategies for locating and using information resources. Each quarter, a series of tutorials is offered giving students further opportunities to meet with a librarian to discuss particular or specialized research needs.

A series of publications is prepared by the library staff to acquaint students with the services and collections in the University Libraries and to help students with their research. These include a general *Guide to Northeastern University Libraries*, and short guides to services such as the online catalog and CD-ROM, to types of resources such as encyclopedias and periodicals, to resources in particular disciplines such as economics and nursing, and to specific subjects such as science fiction and Caribbean music.

Online retrieval of information from more than 300 specialized databases is provided, for a fee, through the library's Computer Search Services. Citations, often with abstracts, typically are to journal articles, dissertations, technical reports, and symposia. A librarian can advise on the cost for this service.

If a title is not in the University's collections, each library has available for consultation union lists of serials and other research aids that serve as guides to collections in other libraries, both in the greater Boston area and beyond. In addition, reference librarians may conduct a computer search to identify area and other libraries that own a particular title. Interlibrary loan services are available to faculty and graduate students, and under certain conditions, to undergraduates.

Students may use three laboratories in the main library equipped with more than 100 microcomputers with general-purpose programming language, word processing, spreadsheet, and database software. About 500 of the study carrels located throughout the library are linked to the University's academic computing network, so that users who wish to bring their own portable computers can access any other computing resource available to them through this network.

The Media Center coordinates a peer tutoring program for students in all subjects. Tutoring services are arranged by appointment and are free of charge.

The Media Production Laboratory is a self-service facility with staff available to train and aid students and faculty in creating presentational media products such as slides and overhead transparencies.

■ Boston Library Consortium

Northeastern University is a member of the Boston Library Consortium, a cooperative arrangement among the following academic and research institutions: Boston College, Boston Public Library, Boston University, Brandeis University, the Massachusetts Institute of Technology, the State Library of Massachusetts, Tufts University, the University of Massachusetts (Amherst, Boston, and Worcester campuses), and Wellesley College. The University's membership in the Boston Library Consortium generally allows for on-site use by, but does not grant borrowing privileges to, students at Northeastern. Some of the consortium libraries and many of the other libraries in the Boston area require that a visiting student present a special pass or letter of introduction. A Northeastern reference librarian can advise about such student visitor policies.

Academic Assistance Center

Mary F. Leslie, Ed.M., *Acting Director*

The Academic Assistance Center (on the Fenway) offers free testing and tutoring services to Northeastern students. Graduate and upperclass students serve as tutors, providing individual or small-group review in most subjects. At the center's Reading Lab, students can receive professional assistance in reading, vocabulary, notetaking, test preparation, and related reading and study skills. Referrals to other University assistance facilities (the Writing Center, the Math Center, Counseling and Testing, and the Disability Resource Center) are made as appropriate. The center is open from 8:30 A.M. to 4:30 P.M. Monday through Friday. For more information, telephone the Academic Assistance Center at 617-437-4300.

Alumni Association

More than 114,000 alumni now form the Alumni Association, created to benefit Northeastern and its graduates. The association is governed by an executive committee elected from the alumni community. Membership is automatic upon graduation. Association activities include Homecoming, presentation of the Outstanding Alumni Awards, and the annual presentation of Professional Promise Awards to outstanding seniors in each college. Notice of all association activities is published in the *Northeastern Alumni Magazine* and in other specialized publications.

Alumni officers, in conjunction with the Office of Alumni Relations, have established a series of enrichment/education programs to meet the vocational and avocational needs of Northeastern's graduates. The Alumni Association has also initiated a successful group travel program to provide the alumni of Northeastern with interesting and economical opportunities for foreign travel. It also sponsors group term life insurance.

Regional alumni clubs have been established from coast to coast. All alumni are eligible to become members of these organizations. The clubs meet periodically. Their programs are varied and are often presented in conjunction with professional and athletic events, faculty visits, and service projects. Additionally, alumni class organizations conduct reunions for their respective classes every five years, and Golden Graduates' Day, for senior alumni, has become an annual event.

The association sponsors and assists constituent organizations that focus on common professional and avocational interests and college affiliations. These groups have their own officers and conduct various programs throughout the year.

Regional alumni clubs provide a valuable service to the University by sponsoring admissions conferences for high school students and the parents of students who are interested in attending college. Alumni volunteers across the nation represent the Admissions Office on a continuing basis at high schools and community colleges.

The association is headquartered in the Office of Alumni Relations, 125 Richards Hall, 617-437-3186. Addresses of alumni are maintained in the Office of Alumni Records, 617-437-2791.

Center for the Study of Sport in Society

Richard Lapchick, Ph.D., *Director*

This center, the first of its kind in the nation, was founded to address the abuses of athletes' education and rights. It has established a university degree completion program for current or former professional athletes and has formal agreements with the National Hockey League Players' Association and the National Hockey League. The center also is the hub of a national consortium of universities for the University Degree Completion Program. There are currently 55 members of the consortium. More than 1,000 athletes have returned to participate in the degree completion programs of the consortium.

More than 183,000 students, parents, teachers, and coaches have been reached by the nearly 100 pro athletes who have participated in the center's Community and School Outreach Program. The center and its consortium sponsor National Student-Athlete Day, with events in all 50 states. The center sponsors seminars and a broad-based curriculum in sport and social issues, gives annual awards for excellence in sports journalism, and promotes campus-wide lectures, forums, and news conferences. Three journals are published through the center: the *Journal of Sport and Social Issues*, the *ARENA Review*, and the bimonthly *CSSS Digest*.

The director of the program is an author, scholar, and civil rights activist. Keith Lee, a six-year veteran of the NFL, is an associate director and public school outreach coordinator. Anita DeFrantz, Olympic medalist and a member of the International Olympic Committee, is the western coordinator. For more information about the center, call 617-437-5815.

Counseling and Testing Center

Judith A. Clementson, Ph.D., *Associate Dean and Director*

The Counseling and Testing Center provides a broad range of counseling services for Northeastern students. These services include assistance in choosing an appropriate college major, career planning, resolving personal loss and life adjustment problems, developing satisfying interpersonal relationships, improving study skills, and dealing with difficult feelings such as anxiety or depression. The center provides short-term counseling (12 sessions maximum); if longer-term treatment is needed, assistance is offered in the form of referrals and resources.

In addition to individual counseling, students may take psychological tests to increase their self-knowledge, join a group of students with whom they share concerns, use self-help tapes, or make use of the center's file of information about careers. There is no charge for these services for enrolled Northeastern students.

Department of Career Development and Placement

Carol S. Lyons, M.Ed., *Interim Dean and Director*

The Department of Career Development and Placement offers career guidance, counseling, and placement assistance to all students, alumni, and employees of the University. Job files are maintained and contacts are made with potential employers. The department helps students formulate career plans, prepare for entry into the work force, and find satisfactory employment. This assistance is provided in the form of a variety of workshops (among which are résumé preparation, cover-letter writing, interviewing, and the job search) and undergraduate elective courses on career development topics. Courses are subject to normal tuition charges, but all other services are provided without charge except for a nominal fee for duplicating and forwarding credential files.

This department houses the Career Resource Center, which contains a collection of up-to-date career literature and other materials, including career planning texts, annual reports, descriptive brochures, catalogs, and information on over 1,200 organizations. A job bank of employment opportunities is updated daily. Individuals can apply directly for these opportunities. A collection of internship opportunities is also available in the center.

The department also assists undergraduate students and alumni who seek admission to graduate or professional schools; arranges internships for undergraduate and graduate students; and provides information and advice for students who wish to study abroad.

GIS, a computerized Guidance Information System, helps users explore graduate and professional schools, sources of financial aid, and occupational options. Staff are available by appointment for individual career counseling, and on a walk-in basis for résumés, and cover-letter critiques.

Disability Resource Center

Ruth K. Bork, M.Ed., *Director*

Often, the degree of physical accessibility and types of available support services play an important part in a disabled student's selection of a college. Northeastern's physical plant and support services render it doubly accessible.

Northeastern's buildings are relatively close to one another. Nearly all of them have elevators open to use by everyone. Of special advantage is the tunnel system that links most buildings. During inclement weather and throughout the harsh New England winter, this proves a universally welcome feature.

Any student who has a disability-related special need—no matter how small or individual—receives ready support services from the Disability Resource Center (DRC). Disabled students are therefore strongly urged to meet with the center's staff early in their consideration of Northeastern—to discuss services available and to experience the campus firsthand.

To avoid unnecessary delays or confusion caused by last-minute adjustments, visitors should contact the DRC director for assistance. (See the end of this section.) The following types of assistance are available:

Counseling Personal, academic, and referral services.

For the Deaf/Hard of Hearing Academic services include oral and sign language interpreters, note takers, TTYs (all key departments), and audio loops. Dormitories have visual fire alarms. The Speech and Hearing Clinic provides speech therapy, audiometric testing, and hearing-aid evaluation, fitting, and orientation. Sign language classes are available through the American Sign Language Program (see page 90). *Sign language interpreting and oral interpreting services will be provided to deaf and hard-of-hearing students only after they have been denied such services by their Division of Vocational Rehabilitation, provided the Disability Resource Center has received information documenting the reason for such denial.*

General Assistance Services include counseling, scribes, advocacy liaison with instructors and other University staff, handicapped parking, and alternative examinations.

Housing Assistance with accommodations and/or modification in residence halls.

Information Clearinghouse This clearinghouse offers articles, periodicals, books, and other literature for, about, and by individuals with disabilities.

For the Learning Disabled The center assists in securing taped textbooks and materials, readers, untimed testing, and course and program modification. Services will be provided only upon receipt of diagnostic testing, documentation, and prescriptive write-ups. The WAIS-R and WISC-R are not accepted as documentation of a learning disability. Students without this material can be referred to appropriate agencies for testing.

Orientation Tailored to the needs of specific disability groups, orientation uses tactile maps for vision-impaired students, interpreters for deaf/hard-of-hearing students, and accessible routes of travel for students with mobility impairments.

Registration and Preregistration Assistance to help ensure class accessibility.

For the Visually Impaired The center assists in securing taped and braille textbooks and materials; readers; campus orientation; tactile maps; and auxiliary aids such as brailers, Visualtek readers, raised-line drawing kits, large-print typewriters, talking-book machines, magnifiers, talking calculators, adapted computers, variable-speed tape recorders, and the Kurzweil Reading Machine.

For Wheelchair Users/the Mobility-Impaired The center offers information on appropriate routes of travel, assistance in relocating classes, adaptive physical education, and physical therapy.

The DRC is also the gathering place for the Disabled Student Organization of Northeastern University, which works cooperatively with the center to plan programs and improve accessibility of services. For more information or assistance, contact the Disability Resource Center at 4 Ell Building, 617-437-2675 (voice) or 617-437-2730 (TTY).

Division of Academic Computing

John E. Stuckey, M.A., *Director of Academic Computing*

The Division of Academic Computing (DAC) facilitates the use of computers by Northeastern students and faculty. Some years ago that meant maintaining one good-sized computer, used primarily by those doing advanced work in engineering, mathematics, or the physical or biological sciences. More recently, computing has found productive use in nearly every field of study pursued at the university. At the same time, computing activities have increasingly migrated to personal computers, altering the nature of the need for computing services. DAC is committed to meeting these new challenges while continuing to support the traditional, computationally intensive uses of computing.

DAC's Personal Computing Initiative supports personal computing with negotiated discounts on hardware and software (available through the Northeastern Computer Store) and with advice, training, and assistance on personal computer use. The goal is to create an environment as hospitable and supportive as possible to the personal mode of computing.

DAC and its Computing Resource Center (CRC), directed by Jules J. Maderos, maintain the *lynx* communication system for the exchange of computer mail and conference discussions. Participation in *lynx* is available to any member of the Northeastern community and is free. To sign up for a *lynx* account, bring a valid Northeastern I.D. to 39 Richards Hall during business hours.

The CRC also maintains multi-user computing systems for general university use, an advanced high-speed data network for computer communication both inside the university and with other institutions, and numerous student computing labs on the Boston, Dedham, Burlington, and Liberty Square campuses. *ACCESS*, the newsletter of the division, includes the locations, schedules, and facilities of the labs as well as other news about computing at NU.

English Language Center

Paul C. Krueger, Ed.D., *Director*

The English Language Center is an important resource for international students at Northeastern. Its goal is to ensure that students who speak English as a second language are proficient enough to carry on full-time studies in any degree program without language-related problems.

The center administers the Intensive English Program, which offers three levels of intensive noncredit courses in English as a second language—beginning, intermediate, and advanced. Intensive English classes are open to undergraduate and graduate students as well as to students who come to Northeastern to study English only. With the approval of the center's director, those students also admitted to a degree program may take courses for credit while studying advanced Intensive English.

The Intensive English Program offers 20 hours of classroom instruction per week and a number of special services. The weekly program includes classes in English structure, reading, writing, listening, and speaking skills; small-group tutorials; practice in a language laboratory and in a writing laboratory; and help from a pronunciation specialist. Staff work closely with the International Student Office, other offices in Student Affairs, the academic departments, and other University services.

The English Language Center also provides advice and consultation services to the Northeastern community at large. Center staff are available to answer questions from teachers, administrators, and students and can design special programs for special needs on short notice. For more information about the English Language Center, telephone 617-437-2455.

Hearing, Language, and Speech Center

The Hearing, Language, and Speech Center is the setting for graduate students' early training. Under close observation by clinical supervisors and faculty, students may gain skills essential to progress to a second level of experience at local off-campus affiliations. The center has been accredited by the Professional Services Board of the American Speech-Language-Hearing Association as meeting national standards for clinical facilities.

The center, located at 133 Forsyth Building, serves all members of the University community. Diagnostic evaluation and treatment are provided to clients who demonstrate a variety of communication disorders.

HELP Legal Services

The HELP Legal Services Plan offers free consultations and low-cost legal services to all students. Complete confidentiality is assured. Services are available Monday through Friday, 10:00 A.M. to 5:00 P.M. For an appointment, telephone 617-437-2636 or stop by the office at 264 Ell Center.

International Student Office

Sally M. Heym, B.A., *Director*

The International Student Office (ISO) provides a wide variety of services for the more than two thousand foreign undergraduates, graduates, and faculty. Specific services range from advising international students on immigration regulations and academic, financial, and personal concerns to issuing forms and official documents for the transfer of funds from home or for travel outside the United States.

The ISO strives to promote cultural understanding between international and American students by presenting cross-cultural communication workshops, orientation programs, and quarterly newsletters. The ISO also acts as a liaison between the various departments and colleges and the many different public and private agencies concerned with the affairs of foreign nationals in the academic community.

The ISO works closely with the International Student Forum (ISF), an umbrella organization for the many different ethnic organizations on campus. ISF is the center for many international student activities and sponsors such events as ski trips, dinners, picnics, and a week-long celebration in the spring.

Office of Freshman Affairs

Anthony J. Bajdek, M.A., *Associate Dean and Director*

The Office of Freshman Affairs monitors and facilitates the academic progress of freshmen by providing academic counseling and appropriate administrative action. It also applies academic policy, authorizes changes of major (both within and between colleges), prepares special course schedules for students who change their majors as well as for those with advanced placement or advanced standing credit, identifies freshmen with deficient academic records for academic probation, authorizes summer corrective work, and re-enters eligible students at the freshman level as repeaters or continuing freshmen. Midway through each academic quarter, a computer-based Interim Academic Status Report system, involving progress reports prepared by instructors of freshmen, provides detailed evaluations for use by students and the 180 faculty who serve as their advisers. This evaluation is a preventive measure designed to help detect and assist potentially failing students and is managed by Freshman Affairs.

To support the academic progress of freshmen, the Office of Freshman Affairs coordinates the flow of academic information to the faculty who make up the advising system for freshmen and uses appropriate research to measure the success of specific academic support activities and academic programs.

During the course of the year, the staff conducts special seminars designed to assist students identified as having difficulty. When freshmen complete the three academic quarters of their first year, the Office of Freshman Affairs reviews their academic records to determine eligibility for sophomore status.

In fulfilling its responsibilities, the office is not only an important central support service for freshmen, but also an advocate for the concerns of freshmen.

Office of Minority Student Affairs

Ella Robertson, M.Ed., *Director*

The Office of Minority Student Affairs was created in 1968 to respond to the special needs of minority students at Northeastern. Contact with minority students is established prior to registration, continues throughout the first academic year, and thereafter is maintained and encouraged as long as the student wishes.

The staff of the Office of Minority Student Affairs provides a wide range of assistance and guidance. It helps students in matters such as registration, course scheduling, program choice, and academic assistance, and is available for financial, social, and career counseling. The office is also a link between minority students and other departments within the University and assists in the resolution of problems with faculty, staff, or administrators.

The academic performance of all minority freshmen is monitored within the Office of Minority Student Affairs, which also determines whether a student is in good academic standing, should be placed on probation, or should be dismissed from the University. For more information about this office, telephone 617-437-2787.

Orientation Programs for New Students

Harvey Vetstein, Ed.D., *Associate Dean and Director*

Orientation is that time immediately preceding classes that is devoted to affording new students the opportunity to learn about Northeastern and to meet classmates, administrators, faculty members, and advisers.

Orientation is planned and supervised by the Director of Orientation, who sees that students are introduced to the traditions and people that make up the University. At that time, registration, class schedules, and other procedures and details necessary for enrollment are completed.

In accordance with a long-standing tradition, students are welcomed by the President at a special convocation. They also meet with deans and others who will have important roles in their college careers.

Upperclass volunteers assist in setting up and running programs that provide opportunities for relaxation, recreation, and cultural enrichment. Members of the Dean of Students' staff are available during orientation and throughout the year to answer questions and provide assistance.

Preprofessional Advising

The Pre-Health Professions Advisory Committee offers preprofessional counseling for students interested in careers in medicine, dentistry, or related professional medical fields. Committee members are available to discuss the various medical fields, minimum admissions requirements, and the application process.

For students preparing for a career in law, several faculty members can serve as advisers and resource personnel on related curricular and admissions questions.

In addition, the Department of Graduate Placement Services provides information and advice on procedures for admission, preparation of applications, and the scheduling of appropriate admissions tests. For more information, contact a counselor through the Office of the Dean of Arts and Sciences, 400 Meserve Hall.

Public Safety Division

All students are urged to take full advantage of police, parking, fire safety, security, emergency medical and related public safety services offered by the University's Public Safety Division. While the Public Safety Division provides 24-hour services every day of the year, students are reminded that—to minimize being victimized—each individual who lives, works, or studies in an urban environment is responsible for observing basic personal safety and security practices. The Northeastern University Public Safety Division provides assistance to individual students or groups upon request to identify potential security hazards and to help them plan personal safety programs.

Reading and Language Skills

Reading Clinic The Reading Clinic, located in Lake Hall, offers a wide range of diagnostic and corrective services for a variety of reading and language problems. It is open to persons of all ages, including University students. Faculty members are also qualified to administer such tests as the WAIS, WISC, Binet, ITPA, Bender, and most standardized instruments.

Speed Reading The Department of Education offers a noncredit course designed to improve skills and speed in critical and pleasure reading. Offered each academic quarter, the course is available at a reduced tuition rate to students, staff, and alumni of the University.

Related Services See also the Academic Assistance Center, page 217; Office of Freshman Affairs, page 223; the Counseling and Testing Center, page 218; and the English Language Center.

Religious Life Office

Northeastern University is concerned for the religious and moral development of students of all faiths. The Religious Advisory Board, consisting of administrators and faculty as well as full-time chaplains, seeks to articulate the needs in this area and facilitate the work of various religious groups on campus.

The interfaith Chaplains' Association, consisting of full-time chaplains and their full-time assistants, works together on campus religious affairs. The chaplains also deal with students on a denominational basis at various centers near the campus: Episcopal College Work Center at 40 Prescott Street in Brookline; Hillel House at 456 Parker Street for Jewish students; Lutheran Center, 84 The Fenway #14; and St. Ann Roman Catholic Parish and Student Center at 68 St. Stephen Street.

Interfaith services to celebrate special days and events are held in the Bacon Memorial Chapel, located at 211 Ell Building. The chapel is also used for denominational worship services and special lectures on religion. It is open daily for prayer and meditation and is a setting for weddings of both students and alumni.

The Religious Life Office is located at 207 Ell Building and is open from 8:30 A.M. to 4:30 P.M., Monday through Friday (617-437-2728).

University Health Services/Lane Health Center

Bruce W. Lowney, M.D., F.A.C.S., *Director*

The Lane Health Center, 135 Forsyth, serves the health care needs of full-time University students. Staff physicians are available on a walk-in basis Monday through Friday, 9:00 A.M. to 4:30 P.M. Laboratory and radiology services are also available during those hours. A registered nurse is on duty at all times when the clinic is closed.

An emergency telephone number (617-437-2772) is answered by the nurse on duty, who will make appropriate arrangements for any urgent situation, nights, weekends, and holidays. All calls from students in university housing should be made through the resident director.

Clinics in gynecology, orthopedics, sports medicine, surgery, and mental health services have specific hours, and some require referral by a staff physician. Referral for services unavailable in the Health Center can be arranged by a staff physician.

An infirmary is also maintained to care for students living in University housing. These students pay an infirmary fee that entitles them to 20 days of infirmary care at no additional charge (except for special medications).

Students are required to have a record of physical examination on file at the Health Center. Failure to fulfill this requirement may result in an additional fee for a physical examination completed by a staff physician.

Massachusetts state law, Chapter 76, Section 15C also known as the College Immunization Law requires that, in order to register for classes, all full-time college students born since December 31, 1956, and all part-time undergraduates and graduates in the health sciences whose duties require patient contact must present evidence that they are immunized against measles, mumps, rubella, diphtheria, and tetanus. The University, in compliance with public health recommendations, is requiring students to provide documentation of two measles vaccinations. (Medical and religious exemptions are allowed but must be documented. See Admissions, page 24, for more about measles documentation.)

All full-time undergraduate and graduate students are covered by a special Blue Cross/Blue Shield policy that remains in effect continuously from the day of initial registration until the first of the month following graduation, dismissal, or withdrawal from the University. The fee for this insurance may be waived if proof is shown of comparable coverage.

Activities

Student Activities at Northeastern



The University regards student activities as an integral part of education and encourages relaxation and socializing through a wide range of activities: from participating in intramural sports to writing for *The Northeastern News*, broadcasting over WRBB, theatre, and student government. Students may make new friends by joining any of the more than 170 campus clubs and organizations; by attending a lecture, film, or play; or by skiing or camping in the mountains.

A good portion of between-class time will be spent in the Carl S. Ell Student Center, the dominant feature of which is the main lounge. Five stories in height, the striking lounge is a comfortable place to meet, socialize, or study. Housed in the center are three food outlets: a cafeteria, Burger King, and Club Ell where free films and live entertainment are provided regularly. In addition, the Student Center has a ballroom; a large game room with billiards, table tennis, and video games; a typing room; a computer room; many meeting and function rooms; and student organization offices.

The Information Booth staff helps answer questions and offers printing and photocopying services.

Each Monday and Thursday between 11:30 A.M. and 1:30 P.M., no classes are scheduled and these time blocks are reserved for student activities. All students have the chance to become involved in campus activities.

Student Organizations

All-University Organizations

Council for University Programs (CUP)
Concert Committee
Lecture Committee
Publicity Committee
Special Events Committee
Homecoming Committee
Student Alumni Association
Student Court
Student Government Association (SGA)
Student Orientation Staff (SOS)

Performing Arts Organizations

Band
Choral Society
Dance Theatre
Early Music Players
Orchestra
Silver Masque

Departmental and Academic Organizations

Accounting Club
Advertising Club
Art and Architecture Society
Association for Computing Machinery
Association of the U.S. Army
Beta Biology Club
Biomedical Engineering Society
Black Business Student Association
Black Engineering Student Society
Business Student Advisory Committee
Criminal Justice Advisory Council
Economics Club
Educational Council
Fenway Project
Future Black Lawyers' Society
Health, Sport, and Leisure Club
Human Resource Management Club
Human Services Student Organization
Linguistics Society
Math Club
Medical Laboratory Science Club
Musicians' Society
National Honor Society of Scabbard and Blade
Naval Science Association
Nursing Student Organization Council
Peers Reaching Out
Philosophy Club
Physical Therapy Club
Physical Therapy Yearbook
Psychology Club
Public Relations Student Society

Respiratory Therapy Club
The Script (Pharmacy yearbook)
Society of Physics Students
Speech and Hearing Club
Student Athletic Training Association
Student Health Records Association
Terra Society
United Nations Association

Media

Cauldron
The Northeastern News
NU Times
Onyx
Spectrum
WRBB-FM

Special Interest Clubs

Amateur Radio Club
Amnesty International
Anglers' Society
Camera Club
Cheerleaders
Chess Club
College Republicans
Disabled Students Organization
Downhillers Ski and Sports Club
Entrepreneurs' Club
Flying Club
Husky Key Society
Hus-Skiers and Outing Club (NUHOC)
Investment Club
NU Democrats
NU Organization for
 Alternative Lifestyles (NUAL)
NU Reaching Other Worlds (NUROW)
Sailing Club
Society for Creative Anachronism
Students Aligned for Nuclear Disarmament
 (SAND)
Students for Animal Rights (STAR)
Students for Environmental
 Awareness (SEA)
Students for Life
Tactical Society
Women's Center

Religious Organizations

Baha'i Club
Campus Crusade for Christ
Chinese Christian Fellowship
Christian Student Organization
Hillel
Islamic Society
Seekers Christian Fellowship

Ethnic and Cultural Clubs

African Student Association
Arab Heritage Cultural Club
Armenian Club
Cambodian Student Association
Cape Verdean Students Organization
Caribbean Student Organization
Chinese Student Club
Haitian Student Unity

Hellenic Association
Indian Cultural Organization
International Students' Forum
Korean Student Association
Latin American Students Organization
Lebanese Social and Cultural Club
Northeastern Black Student Association
Republic of China Student Association
Vietnamese Students' Club

Fraternities and Sororities

Sororities and fraternities play a vital role in the co-curricular life of the University. They can be reached through the Office of Student Activities, 255 Ell Center.

Fraternities

Alpha Epsilon Pi
Alpha Kappa Sigma
Alpha Phi Alpha
Beta Gamma Epsilon
Iota Phi Theta
Kappa Alpha Psi
Nu Epsilon Zeta
Omega Psi Phi
Phi Beta Sigma
Phi Gamma Pi
Phi Kappa Tau
Phi Sigma Kappa
Sigma Alpha Mu
Sigma Phi Epsilon

Tau Epsilon Phi
Tau Kappa Epsilon
Theta Delta Chi
Zeta Beta Tau
Zeta Phi Beta

Sororities

Alpha Epsilon Phi
Alpha Kappa Alpha
Delta Phi Epsilon
Delta Sigma Theta
Delta Zeta
Sigma Delta Tau
Sigma Gamma Rho
Sigma Sigma Sigma

Intramural and Recreational Sports

A comprehensive program of intramural and club sports is available throughout the year. Students may participate in leisure-time activities through the Intramural, Drop-In Recreation, and Club Sports programs. Structured team sports and dual-sport activities are offered year round, with organizational meetings held at the beginning of each quarter. Students are encouraged to make the Intramural and Club Sports Program a part of their Northeastern experience.

Intramural Program The following intramural activities are offered:

| | | | | |
|----------------------|------|--------|--------|--------|
| <i>Aerobics</i> | fall | winter | spring | summer |
| <i>Basketball</i> | fall | winter | spring | summer |
| <i>Broomball</i> | fall | winter | — | — |
| <i>Flag football</i> | fall | winter | — | — |
| <i>Floor hockey</i> | — | — | spring | summer |
| <i>Ice hockey</i> | fall | winter | — | — |
| <i>Inner-tube</i> | | | | |
| <i>water polo</i> | fall | winter | spring | summer |
| <i>Racquetball</i> | fall | winter | spring | summer |
| <i>Soccer</i> | fall | winter | spring | summer |
| <i>Softball</i> | fall | — | spring | summer |
| <i>Volleyball</i> | fall | winter | spring | summer |
| <i>Wallyball</i> | fall | winter | spring | summer |

Drop-in Recreation Program The Drop-in Recreation Program is an integral aspect of Northeastern's recreational opportunities. It is designed to offer informal activities when facilities are not being used for physical education classes and athletic practices and contests. Recreational facilities include:

| | |
|-----------------------------|----------------------|
| Basketball courts | Nautilus weight room |
| Fitness room | Racquetball courts |
| Free weight room | Stretching room |
| Ice-skating rink | Swimming pool |
| Indoor track and cage | Tennis courts |
| Martial arts/wrestling room | Volleyball courts |

Club Sports Program The Club Sports Program offers both intercollegiate competition and instruction and includes:

| | |
|----------------|--------------------|
| Badminton | Shotokan Karate |
| Fencing | Soccer |
| Figure skating | Tae Kwon Do Karate |
| Judo | Volleyball |
| Lacrosse | Wrestling |
| Rugby | |

Athletic Facilities

The Cabot Physical Education Center, Edward S. Parsons Field, the 6,000-seat Matthews Arena, and the Bernard and Jolane Solomon outdoor track and field facility in Dedham host a daily influx of students, staff, and faculty. The Cabot Gymnasium contains six basketball courts, four weight rooms (Nautilus, free weights, and Universal), a wrestling and martial arts room, a renovated multipurpose indoor facility, and four modern racquetball courts.

Parsons Field, home of the Huskies football team, also features Friedman baseball diamond. The Solomon track has an eight-lane, Action Trak 200 running surface and an expansive area for concurrent jumping and field events. The new outdoor facility hosts dual and championship meet competition and is a permanent site for Northeastern track athletes.

The hockey and basketball teams play their home games in the Matthews Arena. Located near the main quadrangle of the campus, the arena also offers daily free public skating. Matthews Arena is the oldest ice hockey rink in the world.

One of the most popular sport centers is the Barletta Natatorium, home of the Husky swim team. This fine aquatics facility is equipped to handle varsity swim competitions, handicapped swim programs, and recreational swims.

Men's Athletics

The University fields Division 1 teams in baseball, crew, swimming, soccer, cross-country, track and field, football, hockey, basketball, golf, and tennis. Husky varsity entries have competed on such athletic real estate as Henley-on-Thames, England; Madison Square Garden, New York; and Fenway Park.

Based at Friedman Diamond at Parsons Field, the baseball team has won more than 20 games in the North Atlantic Conference in three of the last four seasons, and competed in conference tournament action. The Huskies recently played in the first annual Beanpot Tournament along with Harvard, Boston College, and Boston University.

Northeastern's basketball Huskies play powers such as Boston University, Illinois, Ohio State, Maryland, Louisville, Houston and Virginia. Even against the cream of

the east, Northeastern has had 27 winning seasons in the last 30 years and has participated in 6 of the last 10 NCAA championships.

Varsity crew has experienced one of the University's most rapid advances. In 1965, its first season, the crew won four of five regattas and the small-college rowing championships. It became the first NU team to compete internationally (in the Henley Royal Regatta). The next year, the Huskies moved into the major college rowing league. They won the Eastern Sprints in 1972 and 1973 and rowed in the finals of the Grand Challenge Cup of the Henley Royal Regatta. In 1978, the freshman crew won the Eastern Sprints and was invited to row the Thames Challenge Cup race at Henley. The Northeastern crew returned to Henley and the Challenge Cup as champions of the I.R.A. Regatta in Syracuse in 1988.

Northeastern annually fields one of the most competitive Division I-AA football teams in New England. A partial list of the Huskies' opponents includes New Hampshire, Massachusetts, Lehigh, James Madison, Rhode Island, and Harvard. Three current National Football League players earned varsity letters and undergraduate degrees from Northeastern.

The University's hockey team skates in the Hockey East Association that includes three Boston-based teams. In 1985, the Huskies became the first team to win back-to-back Beanpot Hockey Tournaments since 1979, and, three years later, they captured the prestigious Beanpot and Hockey East championships.

In 1988, the men's varsity swimmers captured the coveted ECAC Championships.

To discuss track and cross-country in New England is to talk about Northeastern track and cross-country. The Huskies have captured ten New England indoor titles and as many outdoor championships. Each year, Northeastern alumni run for national and international honors as members of top track and field clubs. Several Northeastern track athletes have competed in Olympic Trials and Games over the past two decades. Recently, the University cross-country team earned a berth in the NCAA Championships and was represented by an All-America selection.

Women's Athletics

The rapid growth of the Northeastern University women's intercollegiate athletic program reflects recent tremendous growth in women's athletics at all levels. The program now encompasses basketball, crew, cross-country, field hockey, gymnastics, ice hockey, swimming and diving, track and field (indoor and outdoor), and volleyball. Athletic scholarships are available to women student athletes in all programs. Policies and guidelines on academic eligibility for athletic participation are available to all student athletes upon request.

Northeastern's goal is to provide an excellent program of athletics for all women students who qualify. Our programs are in the mainstream of the exciting growth in women's athletics throughout the country. As a member of the NCAA, Northeastern University subscribes to all policies and regulations of the association.

In the past year, our field hockey team maintained their position in the nation's top ten, finishing eighth in the nation in Division I in 1989. The gymnastics team continued to push toward the NCAA Regional Championship. The ice hockey team, which makes its home in Matthews Arena, repeated as the top team in the country by winning the 1989 ECAC Championship.

Appendix

Governing Boards and Officers of Northeastern

Officers of the Corporation and the Board of Trustees

George J. Matthews, *Chairman*
William F. Allen, Jr., *Vice Chairman*
John Lowell, *Vice Chairman*
Vincent J. Lembo, *Secretary*
Deanna P. Jantzen, *Assistant Secretary*
Joseph D. Murphy, *Assistant Secretary*
Byron K. Elliott, *Lifetime Chairman, Emeritus*
Robert H. Willis, *Chairman Emeritus*
Thomas E. Cargill, Jr., *Vice Chairman Emeritus*
William R. Driver, Jr., *Vice Chairman Emeritus*
Frank L. Farwell, *Vice Chairman Emeritus*
Charlotte B. Smith, *Vice Chairman Emerita*
D. Thomas Trigg, *Vice Chairman Emeritus*

Board of Trustees

Class of 1991

Vincent Barletta
Louis W. Cabot
John J. Cullinane
Phil David Fine
Arnold S. Hiatt
Kenneth A. Loftman
John Lowell
Katherine S. McHugh
Edward O. Owens

Class of 1992

Michael J. Cronin
Joseph E. Heney
George S. Kariotis
Diane H. Lupean
Peter F. O'Connell
William J. Pruyn
Bernard Solomon
H. Patricia Taylor
Alan D. Tobin
Robert H. Willis
Charles A. Zraket

Class of 1993

Ruth S. Felton
Neal F. Finnegan

Ernest Henderson III
Carl R. Hurtig
Harvey C. Krentzman
Robert C. Marini
George J. Matthews
Kenneth G. Ryder
W. Nicholas Thorndike
James L. Waters
Catherine A. White

Class of 1994

William F. Allen, Jr.
Frederick L. Brown
Helene R. Cahners-Kaplan
Gary L. Countryman
James S. Hekimian
Kathryn M. Nicholson
Richard C. Ockerbloom
Dennis J. Picard
George A. Snell
Stephen J. Sweeney
Martin F. Walsh

Honorary Trustees

James V. Fetchero
Kenneth G. Fisher
Thomas L. Phillips

Lifetime Trustees, Emeriti

Diana J. Auger
Roy H. Beaton
F. Gregg Bemis
Thomas E. Cargill, Jr.
William R. Driver, Jr.
Byron K. Elliott
Frank L. Farwell
Lloyd S. Glidden, Jr.
Donald B. Guy
Allan M. Hale
Robert L. Johnson
Henry C. Jones
Frances C. Kenerson
Lawrence H. Martin
Francis J. Quirico
Charlotte B. Smith
Donald W. Smith
D. Thomas Trigg
Chaplin Tyler
Alvin C. Zises

Ex Officio

John A. Curry
University President

Board of Overseers

Class of 1991

Philip M. Chrusz
Joseph D. Feaster, Jr.
Arnold I. Friedman
Frederic T. Hersey
John J. Hurley, Jr.
C. Joseph LaBonte
Joseph C. Lawler III
Walter E. Mattson
Alan S. McKim
John A. McNeice
George Putnam

Class of 1992

Louis H. Barnett
Frederick Brodsky
Harry T. Daniels
Carl E. Dantas
Phil Johnston
John F. Smith

Peter V. Sorgi
Galen L. Stone
Carole J. Uhrich
Edward L. Wax
John T. Williams

Class of 1993

George D. Behrakis
Scott M. Black
Stuart Marshall Bloch
William L. Brown
Richard P. Chapman, Jr.
Robert A. Clayson
Carol L. Cone
T. Paul Connolly
William J. Cotter
James A. Daley
Melanie C. Dean

Class of 1994

Kenneth W. Ballou
Richard L. Bready

William Elfers
Albert S. Frager
Brenda J. Furlong
Judy George
Colby Hewitt, Jr.
Donald J. Kramer
Chan K. Lin
K. Prescott Low
Jasper W. Morgan, Jr.

Ex Officio

John A. Curry
University President
George J. Matthews
Chairman, Board of Trustees
President, Alumni Association
Chairman, The National Council

Members of the Corporation

Class of 1991

Richard A. Albertini
George R. Baldwin
*Vincent Barletta
Michael A. Brown
*Louis W. Cabot
Lawrence G. Cetrulo
§Philip M. Chrusz
George C. Chryssis
James E. Coffield, Jr.
William E. Cook
Dorothy G. Cooley
T. Jeff Coolidge, Jr.
S. James Coppersmith
*John J. Cullinane
Douglas G. DeVivo
§Arnold I. Friedman
Charles K. Gifford
§Frederic T. Hersey
*Arnold S. Hiatt
§John J. Hurley, Jr.
Ralph E. Hutchins
John F. Kerry
§C. Joseph LaBonte
§Joseph C. Lawler III
Bertram M. Lee
*Kenneth A. Loftman
*John Lowell
*Robert C. Marini
‡Lawrence H. Martin
M. Dorothy Massey
§Walter E. Mattson

William J. McCune, Jr.
*Katherine S. McHugh
§Alan S. McKim
§John A. McNeice, Jr.
Dominic Meo, Jr.
Donald H. Moore
James A. Morris
E. James Morton
Donald S. Moscone
Lawrence C. Moulter
N. Laurence Nagle
William H. Nichols, Jr.
Stanley C. Olsen
James H. Orr
*Edward O. Owens
Ara Oztemel
Sophia H. Pappas
Lawrence T. Perera
Nicholas V. Petrou
Edward E. Phillips
†Thomas L. Phillips
Edward D. Phinney
Jerome M. Powell
Albert Pratt
John F. Prendiville
§George Putnam
‡Francis J. Quirico
William H. Raye, Jr.
Kathleen M. Rice
D. Paul Rich
Robert Riesman
Daniel J. Roberts

‡Charlotte B. Smith
Seymour L. Yanoff

Class of 1992

§Louis H. Barnett
‡Thomas E. Cargill, Jr.
*Michael J. Cronin
James S. Curvey
§Harry T. Daniels
§Carl E. Dantas
Theodore S. D'Orlando
William J. Downey
Thomas A. Farrington
Robert R. Feier
†Kenneth G. Fisher
Frieda Garcia
Corinne P. Grande
*Joseph E. Heney
Deborah C. Jackson
Edward C. Johnson 3d
Robert F. Johnson
‡Robert L. Johnson
§Phil Johnston
*George S. Kariotis
Paul G. Keough
James J. Kerasiotes
Andre A. Laus
*Diane H. Lupean
Terence P. McDermott
*Richard C. Ockerbloom
*Peter F. O'Connell
Paul J. Palmer

*Dennis J. Picard
 *William J. Pruy
 W. Warren Ramirez
 Ralph B. Rogers
 Ronald L. Rossetti
 Ernest J. Sargeant
 Donald W. Seager
 Sydney Shaftman
 James L. Shanahan
 Dorothy M. Simon
 Paul D. Slater
 §John F. Smith
 ‡Donald W. Smith
 O. Phillip Snowden
 *Bernard Solomon
 §Peter V. Sorgi
 Robert C. Sprague
 Milton Stern
 David B. Stone
 §Galen L. Stone
 *H. Patricia Taylor
 Lawrence I. Templeman
 Charles H. Tenney II
 Milton A. Thompson
 *W. Nicholas Thorndike
 *Alan D. Tobin
 Paul E. Tsongas
 Joseph F. Turley
 ‡Chaplin Tyler
 William Tyler
 §Carole J. Uhrich
 §Edward L. Wax
 David T. Wendell
 Donald F. Whiston
 §John T. Williams
 *Robert H. Willis
 Richard W. Young
 ‡Alvin C. Zises

Class of 1993

Julius Abrams
 Yousef A. As'ad
 ‡Diana J. Auger
 Robert J. Awkward
 Lincoln C. Bateson
 ‡Roy H. Beaton
 §George D. Behrakis
 ‡F. Gregg Bemis
 Alfred M. Bertocchi
 §Scott M. Black
 §Stuart Marshall Bloch
 S. Whitney Bradley
 Melvin B. Bradshaw
 §Richard L. Bready
 §William L. Brown
 Wayne A. Budd
 John L. Burns
 Victor C. Bynoe
 Milton L. Cail
 James F. Carlin

§Richard P. Chapman, Jr.
 §Robert A. Clayson
 Livingstone N. Coakley
 Abram T. Collier
 §Carol L. Cone
 §T. Paul Connolly
 James J. Costello
 §William J. Cotter
 Edward Creiger
 H. James Crossan, Jr.
 §James A. Daley
 J. H. Dow Davis
 §Melanie C. Dean
 William O. DiPietro
 Alfred di Scipio
 Estelle Dockser
 David F. Doyle
 ‡William R. Driver, Jr.
 *Ruth S. Felton
 Mark S. Ferber
 †James V. Fetchero
 §Judy George
 Joseph A. Grady
 Calvin M. Grimes, Jr.
 *Ernest Henderson III
 Edward L. Hennessy, Jr.
 D. Brainerd Holmes
 *Carl R. Hurtig
 Walter I. Keyes
 Thomas L. King
 *Harvey C. Krentzman
 Dean T. Langford
 George A. MacConnell
 *George J. Matthews
 William M. McDonough
 Arthur A. Pappas
 R. Robert Popeo
 Mark Roosevelt
 *Kenneth G. Ryder
 Thomas F. Skelly
 Ray Stata
 Garrett A. Sullivan
 Wilson B. Tuffin
 Randel E. Vataha
 *James L. Waters
 *Catherine A. White
 *Charles A. Zraket

Class of 1994

*William F. Allen, Jr.
 Jacqueline D. Arthur
 §Kenneth W. Ballou
 Alan D. Bell
 §Frederick Brodsky
 *Frederick L. Brown
 *Helene R. Cahners-Kaplan
 Walter J. Connolly, Jr.
 *Gary L. Countryman
 William S. Edgerly
 Richard J. Egan

§William Elfers
 ‡Byron K. Elliott
 ‡Frank L. Farwell
 §Joseph D. Feaster, Jr.
 *Phil David Fine
 *Neal F. Finnegan
 §Albert S. Frager
 §Brenda J. Furlong
 Murray J. Gart
 Paul W. Glennon
 ‡Lloyd S. Glidden, Jr.
 Rosalind E. Gorin
 John L. Grandin
 ‡Donald B. Guy
 ‡Allan M. Hale
 Michael E. Haynes
 *James S. Hekimian
 William Hellman
 James S. Herbert
 §Colby Hewitt, Jr.
 Richard D. Hill
 Robert W. Holmes
 Hartwell G. Howe
 Richard P. Johnson
 ‡Henry C. Jones
 Richard Kazmaier
 Walter B. Kelley
 ‡Frances C. Kenerson
 Edward M. Kennedy
 Fenton G. Keyes
 Calvin A. King
 §Donald J. Kramer
 Evelyn M. Lane
 Maurice Lazarus
 John R. Leeman
 Elma Lewis
 §Chan K. Lin
 George M. Lovejoy, Jr.
 §K. Prescott Low
 Peter E. Madden
 Maurice Mann
 Sydney Miller
 §Jasper W. Morgan, Jr.
 *Kathryn M. Nicholson
 R. Yvonne Park
 Patrick A. Rivelli
 Janet M. Smith
 *George A. Snell
 Jerry M. Socol
 *Stephen J. Sweeney
 Robert J. Tarr, Jr.
 Jean C. Tempel
 John F. Toomey
 ‡D. Thomas Trigg
 *Martin F. Walsh
 Lucille R. Zanghi
Ex Officio
 John A. Curry,
University President

* Member of the Board of Trustees

† Honorary Trustee

‡ Lifetime Trustee, Emerita or Emeritus

§ Member of the Board of Overseers

Administrative Organization

Officers of the University

John A. Curry, A.B., Ed.M., Ed.D., *President*

Michael A. Baer, B.A., M.A., Ph.D., *Senior Vice President for Academic Affairs and Provost*

Philip T. Crotty, A.B., A.M., M.B.A., M.Sc., Ed.D., *Senior Vice President for Administration*

Edmund L. Deltano, B.A., *Vice President for Finance and Acting Treasurer*

James B. King, B.A., LL.D. (hon.), *Senior Vice President for Government Relations and Community Affairs*

Philip LaTorre, B.S., M.S., *Vice President for Human Resources Management*

John A. Martin, B.S., M.B.A., *Vice President for Business*

John D. O'Bryant, B.S., M.Ed., *Vice President for Student Affairs*

Eugene M. Reppucci, Jr., B.S., M.Ed., *Senior Vice President for Development*

Kenneth G. Ryder, A.B., M.A., L.H.D. (hon.), Litt.D. (hon.), D.Sc.Ed. (hon.), *Chancellor*

Royal K. Toebes, B.S., M.B.A., *Vice President for Alumni Development*

Karl Weiss, B.S., Ph.D., *Vice President for Academic Development and Interim Vice President for Cooperative Education*

Academic Deans, Directors of Schools, and General Administrative Officers

Alan R. Benenfeld, B.Met.E., M.L.S., M.S., *Dean and Director of University Libraries*

Mehdi Boroujerdi, Pharm. D., Ph.D., *Associate Dean of Pharmacy and Director of the Graduate School of the College of Pharmacy and Allied Health Professions*

David P. Boyd, B.A., Ph.D., *Dean of the College of Business Administration*

Cynthia A. Brown, B.S., M.A., Ph.D., *Acting Dean of the College of Computer Science*

Irwin M. Cohen, B.S., M.S., *Director of Men's Athletics*

Martin J. Damian, B.S., *Bursar*

Charles M. Devlin, B.S., M.Ed., *Dean of Student Financial Services*

William M. Fowler, Jr., B.A., Ph.D., *Vice Provost for Undergraduate Education*

David R. Freeman, B.Mgt.E., M.S., Ph.D., *Associate Dean of Engineering and Director of the Graduate School of Engineering*

William A. Frohlich, B.A., *Dean and Director of University Press*

Daniel J. Givelber, A.B., LL.B., *Dean of the School of Law*

James J. Gozzo, B.S., Ph.D., *Dean of the College of Pharmacy and Allied Health Professions*

Charles L. Hallenborg, B.S., M.P.A., *Dean of Physical Planning and Operations*

Daryl A. Hellman, B.S., Ph.D., *Vice Provost for Faculty Affairs and Student Relations*

Thomas E. Hulbert, B.Mgt.E., M.S., *Director of the School of Engineering Technology and Associate Dean of Engineering*

Ellen S. Jackson, B.A., Ed.M., C.A.G.S., D.H., D.H.L. (hon.), *Dean and Director of Affirmative Action*

John W. Jordan, B.S., M.Ed., *Dean of University College*

Paul M. Kalaghan, A.B., M.S., Ph.D., *Vice Provost for Research and Graduate Education*

William I. Kelly, B.S., M.S., *Director of the Graduate School of Professional Accounting*

Paul H. King, B.S., M.S., Ph.D., *Dean of the College of Engineering*

Paul M. Lepley, B.S., M.Ed., Ed.D., *Dean of Boston-Bouvé College of Human Development Professions*

Robert P. Lowndes, B.Sc., M.B.A., Ph.D., *Dean of the College of Arts and Sciences*

Bruce W. Lowney, M.D., *Director of Health Services*

Philip R. McCabe, B.A., M.Ed., *Dean of Admissions*

Edmund J. Mullen, B.A., M.Ed., *University Registrar*

Kay D. Onan, B.A., Ph.D., *Associate Dean for Faculty Affairs and Director of the Graduate School of the College of Arts and Sciences*

Paul M. Pratt, B.S., M.Ed., *Dean of the Department of Cooperative Education*

Karen T. Rigg, A.B., M.A., Ed.D., *Dean of Students*

Norman Rosenblatt, A.B., Ph.D., *Dean of the College of Criminal Justice and Director of the Graduate Program in Criminal Justice*

Jeanne L. Rowlands, B.A., B.S., M.A., *Director of Women's Athletics*

Phyllis M. Schaen, B.S., M.Ed., Ed.D., *Dean of Administration*

Carole A. Shea, B.S., M.S., Ph.D., R.N., *Interim Director of the Graduate School of the College of Nursing*

Janice Walker, A.B., *Assistant Dean of Boston-Bouvé College of Human Development Professions and Director of the Graduate School*

Mitchell Wand, S.B., M.S., Ph.D., *Associate Dean and Director of Graduate Studies of the College of Computer Science*

Joseph Zolner, B.S., M.P.P.M., *Director of the Graduate School of the College of Business Administration*

Eileen H. Zungolo, B.S., M.Ed., Ed.D., R.N., *Dean of the College of Nursing*

General University Committees

Joint Advisory Council, 1990–1991

John A. Curry, *Chairman*

Michael A. Baer, *Vice Chairman*

Alan R. Benenfeld

David P. Boyd

Cynthia A. Brown

Philip T. Crotty

Edmund L. Deltano

William M. Fowler, Jr.

Daniel J. Givelber

James J. Gozzo

Daryl A. Hellman

John W. Jordan

Paul M. Kalaghan

James B. King

Paul H. King

Philip LaTorre

Paul M. Lepley

Robert P. Lowndes

John A. Martin

John D. O'Bryant

Paul M. Pratt

Eugene M. Reppucci, Jr.

Norman Rosenblatt

Arthur D. Smith

Royal K. Toebe

Karl Weiss

Eileen H. Zungolo

Faculty Senate, 1990–1991

Carol M. Allen

Neil O. Alper

Michael A. Baer

Samuel J. Bernstein

David P. Boyd

Cynthia A. Brown

Richard A. Daynard

William L. Faissler

Edith E. Flynn

Marvin H. Friedman

Peter G. Furth

Daniel J. Givelber

Michael J. Glaubman

James J. Gozzo

Deborah F. Greenwald

Bart K. Gruzalski

Paul H. King

Allen Lee

Paul M. Lepley

Mary Loeffelholz

Wesley W. Marple

S. James Matthews

Sharon M. McKinnon

Stephen W. McKnight

Clay McShane

Joseph W. Meador

Stephen L. Nathanson

Irene A. Nichols

Suzanne Ogden

Robert A. Parsons

Paul M. Pratt

Norman Rosenblatt

Gustav Schachter

Philip E. Serafim

Raoul Smith

Phyllis R. Strauss

Michael T. Vaughn

Ibrahim Zeid

Eileen H. Zungolo

Scholarships

The scholarships listed below are awarded through the Office of Financial Aid. For more information, see the Financial Aid section, page 35.

University Scholarships

Leonard S. Adelman Memorial Scholarship *College of Criminal Justice* This scholarship was established in 1986 through the generosity of the family, friends, and professional colleagues of Mr. Adelman, a 1978 dean's list graduate of the College of Criminal Justice. It is a living memorial to a man of character, courage, and selflessness and to an honored athlete. He was a dedicated police officer, cited more than thirty times for heroism, and in 1980, at age 25, sacrificed his life in the line of duty. The earnings from the fund are awarded annually to a fourth-year student at his college who, in the opinion of its faculty, best exemplifies Leonard's dedication to scholarship, a sound character, and a highly motivated career in law enforcement. Financial need is not a requirement. A plaque or trophy in honor of Mr. Adelman is also presented to the outstanding senior in the College of Criminal Justice interested in a municipal policing career. Both names are inscribed on a memorial master plaque at the University.

The George I. Alden Scholarship Fund *All Colleges* George I. Alden (1843–1926) was a Worcester educator, scientist, and entrepreneur, and a founder of the Norton Company. This fund was created by a 1987 challenge grant from the George I. Alden Trust and matching gifts from more than 600 donors. Leadership donors included: Alden Electronics, Inc.; Vance G. Blake; Robert S. Bleakney; Harry Doehla Foundation; Lawrence H. Fisher, Esq.; GenRad Foundation; Louis L. Guerriere; David D. Haig, Jr.; Louis C. Iandoli; Robert L. Johnson; Mr. and Mrs. Darald R. Libby; New England Telephone Company; Norton Company; Alan P. Pandiani; Edward M. Perdue; Robert J. Perry; John W. Rabe; George P. Sakellaris; Vahan L. Sarkisian; Shawmut Worcester County Bank, N.A.; and Jacob Zager.

The income from the George I. Alden Scholarship Fund is awarded annually to qualified upperclass students participating in the University Honors Program who are residents of Worcester County.

John M. Alden Honors Scholarship *All Colleges* This scholarship was established in 1989 by Northeastern University alumnus S. C. Sviokla '47 and his wife Chanda in memory of Mr. John M. Alden of Needham, Massachusetts. Income from the John M. Alden Honors Scholarship Fund will be awarded annually to students who show financial need and who have earned honors standing in their college.

Vivian B. Allen Scholarships *College of Nursing* The Vivian B. Allen Foundation Endowment for nursing scholarships was established in 1968 through the generosity of the Vivian B. Allen Foundation, Inc. The income from a \$500,000 endowment fund is used to provide scholarship assistance for students entering or enrolled in the College of Nursing of Northeastern University. The application procedures and qualifications for selection are the same as those for all other scholarships.

Alumni Scholarships *All Colleges* Scholarship aid is available to entering students who are relatives of alumni. Applications must show scholastic achievement and financial need.

American Optical Foundation Scholarship *All Colleges* This annual scholarship was established in 1986 through the generosity of the American Optical Company to benefit entering freshmen from communities in southern Worcester County. Awards are made to students who demonstrate ability, soundness of character, and financial need.

Chet April Scholarship Fund *College of Arts and Sciences—Marine Studies* This fund was established in 1971 in memory of Chet April with an endowment provided by his friends and associates in the Lynn Volunteer Tuna Club. The income from the fund is awarded annually to one or more upperclass students enrolled in the marine studies program. Awards are given on the basis of demonstrable financial need and above-average scholastic achievement. Preference may be given to deserving students from the North Shore area.

Irving Aronson Scholarship *College of Engineering—Electrical Engineering* The Irving Aronson Scholarship for Electrical Engineering students was established through the generosity of the family of Irving Aronson as a living memorial to a man who shared his life with many people and who cared so much for the educational process. Income from this fund is awarded or loaned to electrical engineering students who demonstrate financial need and academic responsibility.

Alice S. Ayling Scholarship *College of Arts and Sciences* Several scholarships are awarded annually to students in the College of Arts and Sciences who demonstrate a strong academic record, financial need, good citizenship, and leadership through involvement with extracurricular and community activities. Under normal circumstances, these scholarships continue through the senior year.

Bank of New England Scholarship Fund *All Colleges* This fund was established in 1989 by a generous grant from the Bank toward Phase II of The Century Fund campaign. The award recognizes the extensive and long-term relationships between the Bank and the University, as well as the role played by Northeastern in the quality of life of Boston's citizens. Income from the fund provides financial aid to Northeastern students who are graduates of the Boston Public Schools. Preference is given to minority students who have participated in the academic enrichment program conducted by the Balfour Academy at Northeastern and/or attended West Roxbury High School. Recipients must demonstrate financial need and academic stability.

George L. Barnes Scholarship *All Colleges* This fund was established in 1969 by Miriam P. Poole, daughter of George L. Barnes, in memory of her father, a distinguished member of the Northeastern University Corporation and Board of Trustees from 1937 until his death in 1965.

The income from this fund will annually provide a scholarship to a deserving student from Weymouth, Massachusetts. The award is made on the basis of need and character. Some additional assistance may be given in the upperclass years.

Barry Scholarship *College of Engineering* The Barry Scholarship, established in 1973 by the Barry Division of Barry Wright Corporation, is available to students in the College of Engineering. Preference is given to mechanical engineering majors and sons and daughters of Barry employees on the basis of demonstrable financial need and academic achievement.

Mr. and Mrs. Emil Matthew Bauer Fund *All Colleges* The interest from the fund, established in 1954, is used for scholarships or other financial assistance to students of German birth or of German extraction studying at Northeastern University. The scholarships are available to either men or women students enrolled in any year at the University.

Douglas F. Baxter Scholarship Fund *Mechanical Engineering* The Douglas F. Baxter Scholarship Fund was established in 1979 by Dr. Roy E. Baxter and family to honor a man who loved his country and gave his life in service for it during the Second World War. He had graduated from Northeastern University in 1942. The income from this fund is to be awarded annually to a student at Northeastern University majoring in Mechanical Engineering. This award is based on scholastic achievement and is open to all students, regardless of financial need.

George and Tillie Bennett Scholarship *All Colleges* This fund was established in 1990 by a bequest from George Bennett, a 1924 graduate of the School of Commerce and Finance. Mr. Bennett designated that the income from this fund should be used to provide financial assistance to worthy and needy students to assist them in furthering their education at Northeastern University.

Lena M. and Elbridge A. Bollong Memorial Scholarship Fund *College of Business Administration* This scholarship was established in 1987 in memory of Lena M. and Elbridge A. Bollong. Elbridge A. Bollong was a 1917 graduate of the School of Commerce and Finance. The income from this fund is awarded annually to undergraduate students in the College of Business Administration who demonstrate financial need, academic stability, and soundness of character.

Alvah K. Borman Memorial Scholarship *Gamma Phi Kappa Fraternity Undergraduates* This scholarship was established in 1976 through the generous contributions of Gamma Phi Kappa Fraternity alumni. In 1979, the Gamma Phi Kappa Fraternity Alumni Association, Incorporated, voted to name the scholarship in memory of Alvah K. Borman, Northeastern University's Dean of Graduate Placement. Dean Borman was an active member of the GPK fraternity for over 46 years, serving as an undergraduate brother (Class of 1936) and faculty adviser from 1953 to 1965, an active alumnus until his untimely death in 1979.

Awards from this fund are made annually to undergraduate members of the Gamma Phi Kappa Fraternity who have demonstrated good academic standing. Recipients of this award must have been members in good standing of the Gamma Phi Kappa Fraternity for at least six months prior to the time of award.

Boston-Bouvé Class of 1935 Scholarship *Boston-Bouvé College of Human Development Professions*

This fund was established in 1985 by the graduates of Boston-Bouvé College, Class of 1935. The income from the fund is awarded annually to a sophomore or junior majoring in health education, physical education, or physical therapy in Boston-Bouvé College of Human Development Professions. The recipient must be a responsible student of sound character with demonstrated leadership ability and a minimum quality-point average of 3.0.

Boston Housing Authority Scholarships *All Colleges* As an expression of Northeastern's commitment to the city of Boston, the University has established 100 full-time undergraduate scholarships for residents of housing developments run by the Boston Housing Authority (BHA). Applicants for the scholarships, which were offered for the first time in September 1984, must meet the requirements for admission to Northeastern and be residents of BHA housing.

Martin Brown Scholarship Fund *College of Engineering* This scholarship was established in 1961 by Mr. Martin Brown, an engineering alumnus of the Class of 1921. Its purpose is to assist qualified students enrolled in the College of Engineering who have need and have demonstrated above-average scholastic ability.

Richard D. Bruhmuller Accounting Scholarship *College of Business Administration—Accounting* This annual scholarship was established in 1985 through the generosity of Richard D. Bruhmuller and his wife, Elizabeth. Mr. Bruhmuller, an accounting graduate and partner in the public accounting firm of Tobin & Waldstein, established the fund to benefit students of ability and need who have chosen to pursue a career in public accounting. The income from the fund is awarded each year to an upperclass accounting student who displays ability, soundness of character, and financial need.

Wellington Burnham Fund *All Colleges* This fund provides financial assistance to worthy students of limited means without discrimination as to race, creed, color, or scholastic attainment. It was established in 1961 under the provisions of the will of George A. Burnham.

Godfrey L. Cabot Scholarship Fund *All Colleges* This fund was established by Dr. Cabot in 1954 to help meet the college expenses of employees or children of employees of Godfrey L. Cabot, Inc., and its subsidiary and associated companies. To be eligible, the employee must have completed at least five years of service with the company prior to the time the student enters the University. The University shall determine the number and amount of these scholarships, which are not limited to outstanding students and which are available to evening as well as day students. Students interested in applying for scholarship aid from this fund should communicate with the Cabot Personnel Office or the Office of Financial Aid at Northeastern University.

Cameron and Colby Ellis H. Carson Scholarship Fund *College of Business Administration* This fund was established in 1983 by Cameron and Colby Company, Inc., in honor of Mr. Carson, former president of its Treaty Reinsurance Activity, known as NERCO. The income from this fund is used to assist a freshman in the College of Business Administration who demonstrates not only financial need but also academic promise deemed consistent with the high standards of foresight and acumen that characterized the career of Ellis H. Carson.

Camp Dresser & McKee, Inc., Scholarship *All Colleges* This scholarship was established in 1973 by Camp Dresser & McKee, Inc., and is available to students in all colleges. Preference for awards is based upon demonstrable financial need and academic achievement.

Louis S. Cashman Memorial Scholarship Fund *College of Business Administration* This fund was established by the Massachusetts Credit Union Association (CUNA) and friends of Mr. Cashman in recognition of his outstanding service to the credit union movement in the Commonwealth of Massachusetts. This scholarship is awarded annually to students in the College of Business Administration who have need, with particular preference given to those enrolled in banking and finance.

Gardner A. Caverly Scholarship *All Colleges* This scholarship was established in 1957 through the generosity of Mr. Gardner A. Caverly, an alumnus of the College of Business Administration and a member of the Class of 1934. Its purpose is to provide financial assistance and encourage qualified students from the New England area to attend Northeastern University. In selecting worthy students for these scholarship awards, preference is given to graduates of the Rutland, Vermont, and Laconia, New Hampshire, high schools.

Joel Barry Chase Scholarship *College of Engineering—Civil Engineering* The Joel Barry Chase Scholarship in Civil Engineering was established in 1989 through the generosity of Joel Barry Chase, E'67, for undergraduate students majoring in civil engineering. Annual awards are made on the basis of sound character, stable academic record, and financial need.

Carl W. Christiansen Scholarship *College of Business Administration* The Carl W. Christiansen Scholarship Fund was established in 1976 by Mr. Carl W. Christiansen, a graduate of the School of Commerce and Finance, Providence Division of Northeastern University, Class of 1923. Early in his career, Mr. Christiansen was an accounting instructor and associate dean in the Providence Division. In 1927, the accounting firm of Christiansen, Murphy and Company was founded, which in 1940 became known as Christiansen and Company—Certified Public Accountants. The income from this fund is awarded annually to an entering freshman in the day College of Business Administration who has demonstrated the necessity for financial aid. Preference will be given to students from the state of Rhode Island who are interested in pursuing a career in accounting.

Chryssis/Pappas Memorial Scholarship Fund *College of Engineering—Electrical and Computer Engineering* This scholarship fund was established jointly in 1989 by engineering graduates George C. Chryssis, E'72, ME'77, and Arthur A. Pappas, E'60, in memory of their fathers, Christopher G. Chryssis and Alexander A. Pappas. Grants from the fund provide annual scholarship awards, with preference given to students of Greek descent who demonstrate scholastic achievement and financial need. International students who meet these criteria are eligible.

The donors, both of Greek descent, attended Northeastern after becoming residents of the United States. They later distinguished themselves as engineers and businessmen, founding several successful high-technology companies in Massachusetts. The Chryssis/Pappas Memorial Scholarship Fund expresses the donors' appreciation of their families, their heritage, and the opportunity a Northeastern education holds for those who follow them.

Class of 1967 Alumni Scholarship *Day College* The Northeastern University Class of 1967 Alumni Scholarship was established in 1967 and endowed in 1982 by the Class of 1967. Income from the fund is awarded each year on the basis of financial need, campus activities, and scholastic achievement. Priority will be given to children, other relatives, and friends of the Class of 1967.

Richard S. Cole Scholarship Fund *College of Engineering—Chemical Engineering* The Richard S. Cole Scholarship Fund in Chemical Engineering was established in December 1987 by Richard S. Cole, E'44, an active and loyal alumnus. Income from the fund is awarded annually to a chemical engineering major who has demonstrated academic achievement and financial need.

Ruby H. Cole Scholarship Fund *All Colleges* The Ruby H. Cole Scholarship Fund was established in 1973 under the will of Mrs. Cole, of Boston, Massachusetts. Income from the fund is awarded annually to one or more female students enrolled in or admitted to undergraduate programs of the Basic Colleges of the University and who are graduates of Roxbury High School. Recipients must demonstrate financial need, academic stability, and soundness of character.

Commercial Union Insurance Companies Scholarship *College of Criminal Justice* The income from this fund, established in 1982, is used to provide a scholarship to an entering first-year student who demonstrates need and shows promise of success in the law enforcement field.

Community Scholarships *All Colleges* Established by President Asa S. Knowles in 1963–73, these scholarships provide that Northeastern will ensure the full freshman-year tuition be met through scholarships and grants for qualified students. Students must follow the normal application procedure and demonstrate need. The following Massachusetts communities are designated under this scholarship: Ashland, Belmont, Boston, Brookline, Burlington, Chelmsford, Dedham, Framingham, Marlboro, Marshfield, Milford, Peabody, Stoneham, Weston, Westwood, Weymouth, and Winchester.

Compugraphic Corporation Scholarship Fund *All Colleges* The Compugraphic Corporation Scholarship Fund was established and endowed with a generous gift from an individual. Income from the fund provides financial assistance for persons admitted to or enrolled in full-time undergraduate programs of the Basic Colleges of the University who demonstrate financial need, academic stability, and soundness of character, and who are, at the time of the grant, children of current employees of Compugraphic Corporation, division of Agfa, Inc.

Arnold L. Cormier Memorial Scholarship *College of Criminal Justice* The Arnold L. Cormier Memorial Scholarship Fund was established in 1980 by Joseph L. and Ruth E. Cormier in memory of their son, Arnold, a student in the College of Criminal Justice, Class of 1981. Arnold was a good student with excellent grades and was an active participant in classroom discussions and college activities. To perpetuate the memory of Arnold Cormier and the spirit of good fellowship for which he stood, this scholarship is awarded annually to a senior in the College of Criminal Justice.

George C. and Penio G. Culolias Scholarship Fund *All Colleges* This fund was established in 1986 through the generosity of Mrs. Penio G. Culolias, a friend of Northeastern University, with a strong belief in the value of cooperative education. This scholarship is awarded annually to an upperclass student on the bases of financial need and academic promise.

Salvatore J. and Corinne Danca Scholarship *All Colleges* The Salvatore J. and Corinne Danca Scholarship, established in 1974 by Salvatore J. Danca, a graduate of Northeastern University, Class of 1934, is awarded annually to a student enrolled as a sophomore. Selection is made by the Committee on Scholarships, using academic excellence and financial need as the criteria for selection.

Elizabeth A. Davey Scholarship for Physical Therapy *Boston-Bowvé College of Human Development Professions* The Elizabeth A. Davey Scholarship for Physical Therapy students was established through the generosity of the family and friends at Choate Memorial Hospital on behalf of Elizabeth A. Davey, as a living memorial to a woman who shared her life with so many people. Income from this fund is awarded or loaned to a physical therapy senior who demonstrates superior academic achievement and financial need.

C. Denson Day Scholarship Fund *College of Engineering—Mechanical Engineering* This scholarship was established in 1988 by C. Denson Day, a College of Engineering alumnus from the Class of 1926, and his wife Barbara, in fond memory of two of his professors, Emil Gramstorff and Alfred Ferretti. Income from the fund is awarded to mechanical engineering students who demonstrate financial need and academic responsibility.

Charles M. Devlin Scholarship *All Colleges* This fund was established in 1976 by the members of the Class of 1970 “in honor of our dedicated adviser,” Charles M. Devlin. The income from the fund is awarded annually to upperclass students with proven ability and demonstrable financial need. Preference is given to children of members of the Class of 1970.

Diamond Anniversary Development Program Scholarship *All Colleges* This scholarship was established to commemorate the successful conclusion of the Diamond Anniversary Development Program. This scholarship recognizes the loyalty and generosity of the thousands of alumni and friends, corporations, foundations, and organizations whose significant contributions of time and resources have brought Northeastern University to “that greatness which is its destiny.”

Three \$1,000 scholarships are awarded annually, as follows: to one or more full-time students enrolled in a cooperative education program within a Basic College of the University, to one or more part-time students enrolled in a Basic College of the University, and to one or more full-time students enrolled in the graduate division or a professional school of the University. Consideration is based upon financial need, academic stability, and soundness of character.

William O. DiPietro Scholarship *College of Engineering* This scholarship was established in 1967 through the generosity of Mr. William O. DiPietro, a distinguished alumnus of the College of Engineering and a member of the Class of 1942. The scholarship is awarded to one or more deserving freshmen who demonstrate a high caliber of achievement and a desire to fulfill the limits of their ability in both academic and cooperative periods of study. In considering recipients for this scholarship, preference is given to freshmen enrolled in the College of Engineering who have a desire to major in chemical engineering. It is intended that those students receiving awards from this scholarship might someday contribute to this or other scholarships themselves, thereby perpetuating growing funds that will help other deserving individuals.

Harry Doehla Memorial Scholarship *All Colleges* The Harry Doehla Memorial Scholarship was established in 1974 in memory of Mr. Harry Doehla, founder and president of Doehla Greeting Cards, Inc. During his lifetime, Mr. Doehla provided much financial assistance to young people of limited means to help them in furthering their educational goals.

The awards from this fund are available to undergraduate day students, with preference being given to graduates of Fitchburg High School, Fitchburg, Massachusetts, and Nashua High School, Nashua, New Hampshire. Additional consideration will be given to children of employees of Doehla Greeting Cards, Inc.

Michael A. D’Orlando Scholarship Fund *All Colleges* This fund was established in 1990 by Michael A. D’Orlando, Class of 1952, and a loyal and active alumnus. This scholarship will be awarded annually to a full-time undergraduate student who demonstrates academic stability, financial need, and soundness of character.

Cpl. James B. Downey USMC Scholarship Fund *All Colleges* This scholarship was established in 1970 through the generosity of Mr. William J. Downey, a graduate of the College of Liberal Arts, Class of 1952, in memory of his brother, Cpl. James B. Downey, USMC. The scholarship is to be awarded annually to an upperclass student in the day colleges who has demonstrated the necessity for financial aid.

Agnes F. Driscoll Scholarship Fund *All Colleges* This fund will provide scholarship assistance to students in their upperclass years who have demonstrated financial need and scholastic attainment.

John Elfers Memorial Scholarship *All Colleges* This scholarship was established in 1983 by William and Ann Rice Elfers in memory of Mr. Elfers's brother. The income from the fund is awarded annually to undergraduate students who demonstrate financial need, academic promise, and soundness of character.

Carl Stephens Ell Alumni Scholarships *All Colleges* To honor Dr. Carl Stephens Ell, the second president of Northeastern University, the Alumni Association established these scholarships in 1958. Either first-year or upperclass students enrolled at the University are eligible. Awards will be made to worthy students on the basis of scholastic ability and need. The scholarships are to be distributed as equitably as possible among students in the Basic Colleges and University College. Preference shall be given to sons and daughters of Northeastern alumni.

Elmer H. and Daisy M. Everett Memorial Scholarship *All Colleges* This scholarship was established through a bequest of Elmer H. and Daisy M. Everett, both alumni of Northeastern University. Mr. Everett graduated from the College of Engineering, and Mrs. Everett graduated from the School of Business. They were both members of the Class of 1934. Mr. and Mrs. Everett had a strong commitment to help young people wanting to further their education. The fund is administered by the Office of Financial Aid.

Frank L. and Mary C. Farwell Scholarship *All Colleges* This scholarship was established in 1987 by Frank L. Farwell and his wife, Mary C. Farwell. A member of the Northeastern Corporation since 1956 and a trustee of the University since 1958, Mr. Farwell is retired as chairman of the board of Liberty Mutual Insurance Companies and received an honorary degree from Northeastern in 1985. The income from the fund is awarded annually to freshmen who demonstrate financial need.

Michael T. Federico Memorial Fund *All Colleges* The Michael T. Federico Memorial Fund was established in 1982 by the Rhode Island Alumni Club, fellow alumni, and friends of Michael T. Federico, a graduate of the Class of 1940 and a lifelong resident of the state of Rhode Island. Income from the fund is to be awarded annually to one or more students from Rhode Island who are in their sophomore year, have attained a quality-point average of 3.0 or better, and have demonstrated financial need.

George Raymond Fennell Memorial Scholarships *College of Business Administration* Two full-tuition scholarships are awarded each year to freshmen enrolled in the College of Business Administration. The scholarships are awarded in memory of George Raymond Fennell, formerly assistant director of admissions and director of the Northeastern Student Union.

Neal F. and Mary T. Finnegan Scholarship *All Colleges* This fund was established in 1987 by Neal F. Finnegan, a graduate of Northeastern University, and his brother Richard B. Finnegan, a graduate of Stonehill College, to commemorate the fiftieth wedding anniversary of their parents, Neal and Mary Finnegan. It is the sons' desire that recipients of this scholarship be students from the Roxbury and Dorchester areas of Boston, where they grew up. Preference will be given to freshmen enrolled in the Basic Colleges who demonstrate financial need, academic stability, and soundness of character.

Clara and Joseph F. Ford Scholarship Fund *All Colleges* As loyal friends and generous benefactors of Northeastern University, Joseph F. and Clara Ford were deeply committed to the University and to helping those students who might otherwise never receive a college education and, therefore, never achieve their goals or reach their potential. For years Northeastern benefited from the spirit and support of Joseph and Clara Ford. In scholarships and awards, in libraries, and elsewhere, they made a lasting impact on the University. A member of the Northeastern University Corporation from 1945 to his death, Mr. Ford was a recipient of an honorary degree from Northeastern in 1979. He and Mrs. Ford established this Scholarship in 1962 and contributed to it often during their lifetimes.

Subsequent to Mr. Ford's death in 1984 and Mrs. Ford's death in 1987, a major gift was made to Northeastern University which was added to this Scholarship. Income from this permanently endowed Scholarship Fund will be awarded annually to students who are worthy and deserving of financial support.

Foster Grant Scholarship *All Colleges* This scholarship, established in 1974 by the Foster Grant Co., Inc., of Leominster, Massachusetts, is available to students in any of the full-time undergraduate colleges. Preference is given to children of employees of Foster Grant Co., Inc. Bases for the award are demonstrable financial need and above-average academic achievement.

Chester R. Frost Scholarship Fund *College of Business Administration* This scholarship was established in 1984 through the generosity of Chester R. Frost, a distinguished alumnus of the College of Business Administration and a loyal member of the Class of 1962. Income from this fund is awarded annually as a scholarship to a business student who displays soundness of character, a stable academic record, and financial need. Preference is given to students majoring in accounting.

James R. Fuller Memorial Scholarship Fund *College of Business Administration* This fund was established in 1989 by the family, friends, and business associates of James R. Fuller, a distinguished 1966 graduate of the College of Business Administration. Mr. Fuller was one of 259 passengers on Pan Am flight 103, which exploded and crashed in Scotland on December 21, 1988. A highly successful automobile industry executive and a director of The National Council at Northeastern, Mr. Fuller was vice president in charge of Volkswagen United States, Inc., at the time of his death.

Income from the fund is awarded annually to an undergraduate student with a concentration in marketing who demonstrates academic stability, financial need, and soundness of character. Preference is given to students considering auto industry or international marketing careers.

Herbert W. and Geraldine E. Gallagher Athletic Scholarship Fund *All Colleges* This scholarship was established by Wendy L. Gallagher, a Northeastern University graduate in the Class of 1975, as a tribute and expression of her love for her parents on their golden wedding anniversary.

Herbert W. Gallagher, Class of 1935, was an outstanding athlete as an undergraduate and was elected to the Northeastern University Athletic Hall of Fame in 1975. He served the University with dedication for over 40 years as a successful coach in hockey and baseball and as its athletic director.

This scholarship is awarded annually to a deserving male hockey player who demonstrates financial need, academic ability, and the soundness of character that best exemplifies the Northeastern University athlete.

Gamma Phi Kappa Fraternity Scholarship *All Colleges* The Gamma Phi Kappa Fraternity Scholarship was established in 1972 by the Gamma Phi Kappa Fraternity Alumni Association, Incorporated, and was endowed in 1976 through the generous contributions of Gamma Phi Kappa Fraternity alumni and undergraduates. Awards are made annually from interest on the endowment to undergraduate students enrolled in the basic day colleges of Northeastern University who demonstrate good academic standing and financial need. Undergraduate members of the Gamma Phi Kappa Fraternity are ineligible to apply for this award.

Nathan Gerber Memorial Scholarship *All Colleges* The Nathan Gerber Memorial Scholarship was established in 1974 by Albert Gerber, E'52, and Robert Gerber, E'60, in memory of their father, Nathan, a member of the Class of 1925. The scholarship is awarded annually to a student or students enrolled in the freshman class with a demonstrable financial need. Selection is made by the Committee on Scholarships.

Robert Girouard Memorial Baseball Endowed Scholarship Fund *All Colleges* This scholarship was established by teammates, friends, and associates of Robert Girouard as a tribute to and expression of their love for him. Bob Girouard was a 1959 Business Administration graduate of Northeastern University. He was a conscientious student, a good school citizen, an outstanding baseball player, and a young man of unusual integrity and high spirit. His untimely death was a great loss to his family and friends.

John and Ethel Goldberg Scholarship Fund *All Colleges* This fund was established in 1984 through a bequest by Ethel Goldberg. The income from this fund is used by the University for the tuition of those students the University deems deserving upon the basis of demonstrable financial need and academic achievement. These awards are available to undergraduate day college students.

Robert L. Goldberg Scholarship *College of Engineering—Chemical Engineering* This scholarship was established in 1988 through the generosity of Robert L. Goldberg, a chemical engineering graduate and a member of the Class of 1959. Income from this fund is awarded annually to those upperclass students majoring in chemical engineering who display soundness of character, a stable academic record, and financial need.

M. William Grant Scholarship *College of Engineering—Mechanical Engineering* This scholarship was established in 1988 by the Ingersoll-Rand Company in honor of M. William Grant, E'47, on the occasion of his retirement. Mr. Grant is an active and concerned alumnus and serves as a director of The National Council of Northeastern University. In his position as Vice President for Technology at Ingersoll-Rand, he was a driving force in the field of mechanical engineering. Mr. Grant attended North Quincy High School, Quincy, Massachusetts; it is therefore his wish that

this scholarship benefit graduates of this school who are enrolled in the College of Engineering. Preference is given to students majoring in mechanical engineering.

Greater Boston Consumer Credit Grantors Association Scholarship *College of Business Administration* In 1985, the Consumer Credit Grantors Association, Inc., established an endowed scholarship fund, the income from which is awarded annually to students from Massachusetts in their upperclass years majoring in business administration. Selection is based on financial need, academic promise, and soundness of character. Preference is given to students who express an interest in the field of consumer credit.

Clifton W. Gregg Memorial Scholarship *All Colleges* This scholarship was established through a bequest of Clifton W. Gregg, a 1915 graduate of the School of Commerce and Finance of Northeastern University. It was Mr. Gregg's request that "the income for this fund be used for the assistance of financially needy students." The award may be made annually. Recipients are determined by the Committee on Scholarships.

Rabbi Myer O. Grunberg Scholarship *All Colleges* Established in 1953 by Mrs. Myer O. and Miss Rose Grunberg, this annual award is available to a senior student in any college of the University. The award is made to students who have evidenced in personal business and student relations those characteristics of leadership and human relations that make for a better social order. There is no restriction as to race, creed, color, or sex.

Curtis Lemar Haigh Memorial Scholarship Fund *All Colleges* This scholarship was established with a gift of \$5,000 from the parents of Curtis Lemar Haigh as a tribute and expression of their love for him. Curtis Lemar Haigh was a 1981 graduate of Scituate High School, in Massachusetts, and a speech communication major in the Northeastern University Class of 1985. He died on February 1, 1985, before graduating from Northeastern. During his four years at Northeastern, Curtis was perhaps the most active staff member of WRBB, the campus radio station. This scholarship is to be made annually to a speech communication major who is a member of the junior class at Northeastern University and who shows academic achievement and professional promise.

James F. Haley Scholarship Fund *College of Engineering* This fund was established in 1984 through the generosity of Haley & Aldrich, Inc., a leading consulting engineering firm, and the family of Mr. James F. Haley, a distinguished civil engineering graduate and a member of the Class of 1939. The income from the fund is used to assist deserving students majoring in civil engineering who display soundness of character, a stable academic record, and financial need.

Priscilla E. Hargreaves Scholarship *College of Engineering—Electrical Engineering* The Priscilla E. Hargreaves Scholarship for Electrical Engineering Students was established by husband William Hargreaves, E'28, as a loving tribute to a wife whose love and devotion meant so much to him. Income from this fund is awarded to electrical engineering students who have reached their second year, who show a need, and who have demonstrated reasonable academic responsibility.

Charles W. Havice Scholarship *All Colleges* This scholarship was established by the members of the Student Union upon the retirement of the former Dean of Chapel, Charles W. Havice. The income from the fund is awarded annually to upperclass students who are active in the Student Union. Students should demonstrate financial need.

Charles Hayden Memorial Scholarships *All Colleges* The Charles Hayden Foundation, created by the will of the late Charles Hayden, an alumnus of the Boston English High School, offers annual memorial scholarships to first-year students at Northeastern University. The scholarships are awarded to "deserving boys" whose parents are unable to finance the entire cost of their education.

Frederic T. Hersey Scholarship *All Colleges* This fund was established in 1990 by a gift from Frederic T. Hersey, a 1956 graduate of the College of Business Administration, member of the Northeastern University Corporation and Board of Overseers, and a former Chairman of The National Council. This award will be made annually to a full-time, undergraduate, day student who demonstrates academic stability, financial need and soundness of character.

David Hesketh Scholarship Fund *All Colleges* This fund was established in 1987 by Stanley Hesketh, Jr., a 1976 graduate of University College, in loving tribute to his brother David, a graduate of the College of Engineering, Class of 1972. The income from this fund is awarded annually to students who have worked at the University in providing service to handicapped college students attending Northeastern. The recipients must demonstrate financial need, and preference will be given to students majoring in health-care professions.

Oscar and Zelia Hodgkins Memorial Scholarship *Boston-Bouvé College of Human Development Professions* The Oscar and Zelia Hodgkins Memorial Scholarship Fund, established in 1986, provides financial assistance to students enrolled in Boston-Bouvé College who demonstrate financial need and academic achievement. This scholarship is awarded annually to an entering freshman and will continue for each subsequent year as long as the student remains in Boston-Bouvé College and demonstrates normal academic progress.

Kathryn S. Horbal Scholarship *College of Engineering—Chemical Engineering* The Kathryn S. Horbal Scholarship for female chemical engineering students was established by Kathryn's family as a loving tribute to a daughter whose short lifetime meant so much to so many. Income from this fund is awarded to female chemical engineering students who have reached at least their middle year and who have demonstrated academic responsibility.

Richard Melvin Horwitz Memorial Award for Excellence in Electrical Engineering *College of Engineering—Electrical Engineering* The Richard Melvin Horwitz Memorial Award for Excellence in Electrical Engineering was established in 1967 by Leonard J. Horwitz in memory of his brother, Richard Melvin Horwitz, a member of the Class of 1945 in the College of Engineering who died in action during World War II. The award recognizes academic achievement and excellence and is presented annually to an outstanding undergraduate senior majoring in electrical engineering.

Walter F. Howe Memorial Scholarship *College of Business Administration* This fund was established in memory of Walter F. Howe, Class of 1968, who, within one week after graduation, was fatally wounded while pursuing thieves who had stolen his landlord's car. The scholarship was established through the generosity of Walter's friends and relatives in memory of his ideals of good citizenship and civic responsibility. It is awarded annually to a student in the College of Business Administration who demonstrates not only financial need but also good citizenship and civic responsibility. The scholarship is open-ended, so that additional sums can be added to it in future years, and is awarded by the University without restrictions as to race, color, geographic origin, or scholastic attainment.

Edward L. Hurtig Scholarship *All Colleges* This scholarship was established in 1968 through the generosity of the Hurtig family in memory of Edward L. Hurtig, an alumnus of the College of Engineering, Class of 1946. The scholarship is awarded annually to an entering freshman in the day colleges who has demonstrated the need for financial aid. Preference is given to recipients of the Supplemental Educational Opportunity Grants Scholarship Program of the United States Office of Education.

Maurice A. and Nellie L. Idelson Award *All Colleges* This award, established in 1968, is given annually to an entering freshman in the day colleges who has demonstrated the need for financial aid. Preference is given to graduates of the Boston English High School. Should there be no qualified candidate from this source, the award will then be given to any worthy student.

Jamaican Associates, Inc., Scholarship *All Colleges* The Jamaican Associates, Inc., Scholarship, established in 1981 by the Jamaican Associates, Inc., is awarded annually to a student who is either a citizen of Jamaica and who intends to return to Jamaica upon graduation or to a student who is of Jamaican descent. Preference is given to a second-year student with demonstrable financial need and proven academic performance.

George and Florence R. Jamieson Scholarship Fund *College of Business Administration* This fund was established in 1984 through the generosity of Mr. George Jamieson in the name of his parents. The donor, Mr. Jamieson, majored in accounting at Northeastern, graduated with the Class of 1959, and has used his preparation at Northeastern to distinguish himself with the firm of Price Waterhouse & Co., where he is a partner. The income from his gift is used to assist deserving students majoring in business administration who display soundness of character, a stable academic record, and financial need. Preference is given to students majoring in accounting.

Joseph Anthony Johnson Scholarships *College of Engineering—Mechanical Engineering* Established in 1968 by the will of the late Joseph Anthony (Johansen) Johnson of the Class of 1928, the income provides scholarship aid for students enrolled in the Department of Mechanical Engineering, with preference given to students of Scandinavian origin.

Ralph P. Johnson Scholarship Fund *Electrical Engineering and Computer Science* Administered by the Office of Financial Aid and awarded to a computer science or electrical engineering major, this fund was established in 1980 by David R. Johnson, an alumnus of the Class of 1970, in honor of his father. It is the donor's desire that recipients of this fund assume the moral obligation to reimburse the fund in future years as they may be able in order to make additional financial aid available for other students.

Kerkor Kassabian Athletic Training Endowed Scholarship Fund *All Colleges* This fund was established in October 1986 by relatives, friends, and former students of Kerkor (Koko) Kassabian, whose name was synonymous with the field of athletic training in New England. Koko, the head athletic trainer at Northeastern from 1953 to 1965, is a member of the Northeastern University Varsity Club Hall of Fame and the National Trainer's Association Hall of Fame and an associate professor of Health, Sports, and Leisure Study at the University, where he also directs the athletic training curriculum. The income from the fund is awarded to students pursuing a Bachelor of Science in Education degree with a specialization in athletic training.

Dr. LeRoy C. Keagle Memorial Scholarship Fund *College of Pharmacy and Allied Health Professions* The Dr. LeRoy C. Keagle Memorial Scholarship Fund was established in 1975 through the generosity of family and friends of Dr. LeRoy C. Keagle, a man of high integrity and commitment to the profession of pharmacy who, at the time of his death on December 15, 1974, was dean of the College of Pharmacy and Allied Health Professions at Northeastern University. The income from this scholarship fund is awarded annually to a student in the undergraduate pharmacy program who is entering the junior or senior class. Recipients must demonstrate financial need, academic stability, and soundness of character.

Robert G. Keene Memorial Scholarship Fund *All Colleges* This fund was established in 1979 in memory of Robert G. Keene, a graduate of Lincoln College, Class of 1972. The endowment funds were provided by the friends and associates of Robert G. Keene and by the Polaroid Corporation, where he served as an engineering manager. The income from the fund is awarded annually to an undergraduate student who demonstrates financial need as well as strong character and initiative. Primary consideration is given to children of Polaroid employees.

Eunice Kenyon Memorial Scholarship Fund *All Colleges* This fund was established in 1985 by the family of the late Eunice Kenyon, an outstanding and dedicated professional in the field of blindness and special education. Income from the fund is awarded annually on the basis of financial need to a blind student or a student preparing for the field of medicine with emphasis on treating the blind.

Virginia DeVaux Kerr Scholarship *College of Engineering/College of Nursing* This fund was established in 1984 through the generosity of George R. DeVaux. Mr. DeVaux graduated from the College of Engineering with the Class of 1963. His gift established this fund in honor of his mother, Virginia DeVaux Kerr, to benefit those students majoring in engineering or nursing who display soundness of character, a stable academic record, and financial need.

Martin Luther King, Jr., Scholarship *All Colleges* The Martin Luther King, Jr., Scholarship is granted annually to incoming freshman, graduate, and transfer minority students who have demonstrated the philosophy of peaceful coexistence and change through nonviolent means espoused by Dr. King and who have an above-average scholastic record. The scholarship, in the amount of \$500, requires a minimum quality-point average. Financial aid based on need is available to supplement the scholarship.

Andrew C. Knudsen Memorial Scholarship *College of Engineering* The Andrew C. Knudsen Memorial Scholarship was established in 1982 by Johanna M. Knudsen in memory of her beloved brother, Andrew C. Knudsen, LI'52, B'55, who passed away on April 14, 1978. The scholarship award is to be made annually to two students, preferably one in the College of Engineering and one in the Alternative Freshman-Year Program, who have demonstrated leadership qualities, have proved worthy, and are of good character. Based on financial need, the awards are made annually from the income of the fund.

Vena Morse Lamson Scholarships *All Colleges* These scholarships are provided through the income of a fund established in 1963 by Horatio W. Lamson in memory of his beloved wife. They are awarded annually to needy and worthy students who are enrolled in any of the Basic Colleges of the University. The scholarships are granted by the Committee on Financial Aid of the University without regard to national origin, sex, race, or creed.

Irving Landfield Scholarship *All Colleges* This fund was established in 1972 through the generosity of Irving Landfield, a graduate of the School of Commerce and Finance of Northeastern University, Class of 1923. The income from the fund is awarded annually to help deserving and needy students who demonstrate a desire to fulfill the limits of their ability in academic and cooperative periods of study. The income from this fund is administered and awarded by the University without restriction to race, color, creed, geographic origin, or scholastic attainment. It is Mr. Landfield's desire that recipients of the scholarship assume a moral obligation to contribute to the principal of this fund, as they may be able, in order to make additional financial aid available for other students in later years.

George M. and Irene M. Lane Scholarship Fund *All Colleges* This scholarship fund was established in 1979 by the family of Dr. George M. Lane to honor his memory. Dr. Lane's faithful and dedicated service to Northeastern University extended from 1943 to 1975, at which time he retired as director of University Health Services. The income from the George M. and Irene M. Lane Scholarship Fund is awarded annually to an upperclass member of the University's varsity football or hockey team who demonstrates financial need, academic stability, and soundness of character. Family gifts as well as contributions from friends and associates may be added to the scholarship's endowment.

Avrom Aaron Leve Memorial Scholarship *College of Arts and Sciences—Psychology* This scholarship fund was established in 1957 in memory of Dr. Avrom Aaron Leve, former assistant professor of psychology. The interest is used annually to provide scholarships for upperclass students majoring in psychology. The award is made on the basis of academic achievement, financial need, and character.

Austin T. and June Rockwell Levy Scholarship *All Colleges* This fund was established in 1984 through the generosity of the June Rockwell Levy Foundation to assist deserving Rhode Island undergraduate students with tuition and living expenses. The fund memorializes the concern for the welfare of Rhode Island residents that was shared by Austin T. Levy, an innovator in business and philanthropy, and his wife, June Rockwell Levy.

William F. Linskey Scholarship Fund *All Colleges* This fund was established in March 1980 by alumni and friends of William F. Linskey, an athletic trainer long associated with young athletes in and around the Greater Boston area. A former head trainer for the Northeastern University football team and head hockey coach during the 1942–43 season, Linskey served the City of Cambridge School Department as head athletic trainer and physical therapist for more than 30 years. The income from the fund is awarded to worthy students pursuing courses leading to a Bachelor of Science in Education with a specialization in athletic training.

Russell T. Lowe Memorial Scholarship Fund *College of Engineering—Mechanical Engineering* This fund was established in 1976 in memory of Russell T. Lowe, a graduate of the College of Engineering, Class of 1953. The endowment funds were provided by the friends and associates of Russell Lowe and by the Barry Wright Corporation, where he served as a member of the board of directors and as president of the Industrial and Aero Products Group. The income from the fund is awarded annually to one or more upperclass students enrolled in the College of Engineering. Preference is given to mechanical engineering majors on the basis of demonstrable financial need and above-average scholastic achievement.

Edward J. Lynn Scholarship *College of Business Administration—Accounting* This fund was established in 1984 in honor of Edward J. Lynn upon his retirement by friends and associates and by The Continental Group, where he served as controller. Mr. Lynn was responsible for establishing the extensive cooperative education relationships between Northeastern University and his company. The income from the fund is awarded annually to an upperclass student enrolled in the accounting program of the College of Business Administration. Preference is given to students who demonstrate financial need and above-average scholastic achievement.

George A. MacConnell Scholarship *College of Business Administration* This scholarship was established in 1986 by George A. MacConnell, a 1971 graduate of the Northeastern University College of Business Administration and a senior vice president of Georgia-Pacific Corporation, where he began his employment in 1971. The income from this scholarship fund is awarded annually to upperclass College of Business Administration students participating in the Cooperative Plan of Education who demonstrate financial need and academic stability.

Gilbert G. MacDonald Scholarship *All Colleges* This scholarship was established in 1981 by the family of Gilbert G. MacDonald, former vice president for student affairs and dean of students, and the members of the Student Union. The income from the fund will be awarded annually to upperclass students of proven ability and demonstrable financial need. Preference is given to students who participate actively in the Student Union.

Mary E. MacKinnon Scholarship Fund *College of Arts and Sciences* This annual scholarship was established in 1987 by Robert J. MacKinnon, LA'60, as a loving tribute to his mother. The income from this fund is used to assist a sophomore student in the College of Arts and Sciences who is a U.S. citizen and a resident of Massachusetts, with a preference given to students who have resided in Quincy. The recipient will have demonstrated financial need and academic ability during his or her freshman year at Northeastern University.

Ann Marie Maida Memorial Football Scholarship Fund *All Colleges* This scholarship was established by Vito and Lucy Maida in memory of their beloved daughter, Ann Marie, as a tribute and expression of their love for her and her dedication to her teaching career. Ann Marie passed away in December 1988. This scholarship is awarded annually to a deserving football player who demonstrates financial need, academic stability, and the soundness of character that best exemplifies the Northeastern University athlete.

Dr. Reuben J. Margolin Memorial Scholarship Fund *Boston-Bouvé College of Human Development Professions* The Dr. Reuben J. Margolin Memorial Scholarship Fund was established in 1973 through the generosity of family and friends of Dr. Reuben J. Margolin, an outstanding and dedicated individual and friend who, at the time of his death on April 6, 1972, was chairman of the Department of Rehabilitation and Special Education at Northeastern University.

The income from the Dr. Reuben J. Margolin Memorial Scholarship Fund is awarded annually to a deserving student admitted to or enrolled in the Graduate School of Boston-Bouvé College of Human Development Professions and majoring in rehabilitation and/or special education. Recipients must demonstrate financial need as well as the personal and professional qualities exemplified by Dr. Margolin.

Peter J. Martin Scholarship Fund *College of Business Administration* This fund was established in 1956 under the provisions of the will of Peter J. Martin, a 1949 graduate of the Northeastern University School of Business. Mr. Martin designated that the income of this fund should be used to provide financial assistance to upperclass students of proven ability and demonstrable financial need in the College of Business Administration.

George T. Marvin Scholarship Fund *All Colleges* This fund was established in 1961 under the provisions of the will of George T. Marvin, a graduate of the Northeastern University School of Law, Class of 1918. Mr. Marvin designated that the income of this fund should be used to provide financial assistance to worthy and needy students to assist them in furthering their education at Northeastern University.

George T. Marvin scholarships may be awarded to new students seeking admission to Northeastern and to freshman and upperclass students. Applicants must have satisfactory records of scholarship as of the time of making application and must demonstrate genuine need and good citizenship.

Merchants Tire Company Scholarship Fund *College of Business Administration* This scholarship was established in 1972 by Merchants Tire Company in honor of Max Katz, a Class of 1917 alumnus of Northeastern and founder and chairman of the board of Merchants Tire Company. The scholarship is awarded annually with selection preference given to a son or a daughter of a current employee of Merchants Tire Company enrolled as a freshman within the College of Business Administration who demonstrates financial need, soundness of character, and academic stability.

Dean Constantine N. Meriano Memorial Scholarship *College of Pharmacy and Allied Health Professions* This scholarship, established by the Class of 1950 of the New England College of Pharmacy and subsequently supported by all classes of the New England College of Pharmacy and the Northeastern University College of Pharmacy and Allied Health Professions, is named to honor the memory of Constantine N. Meriano, who was the founder, dean, and chief executive officer of the New England College of Pharmacy until his retirement in 1957. In 1962, the New England College of Pharmacy merged with Northeastern University, and it is now known as the College of Pharmacy and Allied Health Professions. The scholarship is awarded annually to one or more students of the College. Selection will be made by the Committee on Scholarships and will be based on financial need, academic stability, and soundness of character.

George H. Meserve, Jr., Scholarship Fund *College of Arts and Sciences* This scholarship was established in 1979 through the generosity of Robert W. Meserve in honor of his brother, Professor George H. Meserve, Jr., an alumnus of the Class of 1925. Professor Meserve served Northeastern faithfully and with distinction for 42 years, retiring in 1968 as professor and chairman of the Department of Art. Announced at the ceremony dedicating George H. Meserve Hall on the Boston campus, this scholarship benefits worthy undergraduate students who are majoring in art. Recipients should demonstrate financial need, academic stability, and soundness of character.

Harash Mitroo Memorial Athletic Scholarship *All Colleges* This scholarship was established in 1983 through the generosity of the Mitroo family of New Delhi, India, in memory of Mr. and Mrs. Mitroo's son, Harash, a student in the College of Business Administration who was killed in an automobile accident in 1978. A talented artist and outstanding athlete, Harash received

numerous awards for his paintings and for his athletic abilities, including a medal for his performance in an international cricket match against Ceylon.

This scholarship is awarded annually, with preference given to international students, to a member of the varsity men's intercollegiate team in basketball, football, hockey, or track, who demonstrates financial need, soundness of character, and a spirit of good sportsmanship and fellowship. A trophy, designated as the Harash Mitroo Memorial Trophy in Athletics and inscribed with the names of scholarship recipients, is on permanent display at the University.

Clyde W. Morrison Scholarship Fund *All Colleges* The Clyde W. Morrison Scholarship was established in 1974 by Clyde W. Morrison, a member of the Class of 1942. The scholarship is awarded annually to a Braintree resident enrolled as a freshman, with a demonstrable financial need. Selection is made by the Committee on Scholarships.

Morse Shoe, Inc., Scholarship Fund *College of Arts and Sciences* This fund was established in 1984 by Morse Shoe, Inc. Endowment income is used to provide scholarship assistance for an undergraduate who demonstrates financial need, academic stability, and soundness of character. Preference will be given to students from Massachusetts.

Frederick W. Muckenhoupt Scholarship *All Colleges* This award was established in 1961 by Dr. and Mrs. Carl F. Muckenhoupt in memory of their son, Frederick W. Muckenhoupt, Class of 1959 of the College of Engineering. The award is made annually to a student in good standing on the basis of need. Preference is given to a student enrolled in the Department of Electrical Engineering.

Muro Pharmaceutical, Inc., Scholarship *College of Pharmacy and Allied Health Professions* This annual scholarship was established in 1985 through the generosity of George D. Behrakis (Pharmacy '57), president, and his wife, Margo. The fund is restricted to students in their middler, junior, or senior years who are pursuing the degree of Bachelor of Science in Pharmacy. Recipients must have demonstrated high academic ability and financial need.

Victoria L. Namin Memorial Scholarship *College of Pharmacy and Allied Health Professions* This fund was established in 1990 by the Namin family of Southeastern Connecticut to honor Victoria L. Namin, a 1980 Pharmacy graduate. Miss Namin was a dedicated professional who exhibited a zest for life, a love for family, and a concern for the advancement of women. This scholarship is awarded annually to a financially deserving woman student enrolled in the Pharmacy program, with preference to middlers, juniors, and seniors.

Elizabeth A. Neilson Scholarship *Boston-Bouvé College of Human Development Professions* The Elizabeth A. Neilson Scholarship Fund was established in 1976 in memory of William H. and Anastasia Neilson, exemplars of the profession of health education during their lifetimes. The income from the scholarship fund is awarded annually to a student or students with the highest scholastic record majoring in health education, who have completed eight quarters of academic study, with at least four quarters having been taken at Boston-Bouvé College of Human Development Professions. The student(s) must typify the philosophy of the health education profession.

Sean Patrick O'Rourke Memorial Scholarship Fund *College of Arts and Sciences—Political Science Majors* This scholarship was established in 1989 through the generosity of Lawrence A. and Carole A. O'Rourke in memory of their son, Sean Patrick O'Rourke, a Class of 1990 junior majoring in Political Science who was killed in an automobile accident in June 1989. Sean entered Northeastern University in the fall of 1986 and had a great interest in the College of Arts and Sciences and political science.

The income from the fund is awarded annually to juniors or seniors with a major in Political Science who display soundness of character with proven ability and demonstrable financial need. The award or awards will be designated by the Dean of the College of Arts and Sciences in conjunction with the Director of Financial Aid.

Shaun Ouillette Memorial Scholarship Fund *College of Criminal Justice* Established in the memory of Shaun Ouillette, a 14-year-old Canton boy murdered in 1986 by a classmate, this scholarship fund is designed to provide tuition assistance at the College of Criminal Justice to an incoming freshman. Reflecting what were Shaun's aspirations, preference is given to a student who is pursuing a career in law enforcement.

Thomas Anthony Pappas Scholarship Fund *All Colleges* This fund was established in 1980 by the Thomas Anthony Pappas Charitable Foundation. Endowment income is used to provide scholarship assistance to needy students with high scholastic records.

Mary Alice (King) Parsons Memorial Scholarship Fund *School of Journalism* This fund was established in 1955 in memory of Mary Alice (King) Parsons, who graduated with high honors in journalism with the Class of 1971. Her writing, and her contributions to her profession and to those who knew her, are recognized by the generous gifts that established this endowment. The income from this fund is awarded annually by the School of Journalism to assist deserving undergraduate journalism majors who display professional promise and soundness of character. Preference is given to female students.

M. F. Patrick Scholarship Fund *All Colleges* This scholarship fund was established in 1987 by a bequest from Hilda Winslow, a 1916 graduate of Boston-Bouv  College, to provide financial assistance to students who demonstrate financial need, academic promise, and soundness of character and who either were born in or reside in Provincetown, Massachusetts.

Amelia Peabody Honors Scholarships *All Colleges* This endowment was established in 1988 by the Amelia Peabody Charitable Fund to benefit students participating in the University Honors Program. These scholarships are especially meaningful to the Northeastern University community because Miss Peabody was a generous benefactress and a very dear friend of the University during her lifetime. She was also the first woman ever chosen to serve on the Northeastern University Corporation and Board of Trustees. A talented sculptress, Miss Peabody was awarded an honorary Doctor of Fine Arts degree by the University in 1965 in recognition of her artistic talents and humanitarian contributions.

Power Systems Engineering Grants-in-Aid *College of Engineering—Electrical Engineering* A number of public utilities and power equipment manufacturing companies in the northeastern part of the United States have made available grants-in-aid ranging from \$1,000 to \$5,000 to assist able freshmen who are interested in pursuing careers in power systems engineering through study programs leading to the bachelor of science or master of science in electrical engineering degree. These awards are made on the basis of academic achievement in high school and aptitude for, and interest in, the field of power systems engineering, without regard to financial need. Candidates for such grants-in-aid should apply to the Dean of Admissions at Northeastern University not later than March 1 of the year in which they wish to enter the College of Engineering.

Lawrence Harlow Pratt Athletic Scholarship Fund *All Colleges* This fund was established in 1979 by the Northeastern University Varsity Club in conjunction with the Athletic Development Program Fund Drive to honor and recognize Lawrence Harlow Pratt. For more than four decades, Larry was the spirit of Northeastern athletics. His greatest joys were the young men he persuaded to attend college. He encouraged them, cajoled them, sometimes scolded them, but always inspired them to complete their intercollegiate careers and go on to become outstanding members of the community. The income from the fund is awarded annually to a financially deserving varsity athlete(s).

Charles Protaps Endowment Fund *All Colleges* This fund was transferred to Northeastern University in 1983. It was established through the will of Charles Protaps, a Lithuanian immigrant who became a common laborer in this country. The purpose of the fund is to aid men and women of Lithuanian extraction to acquire a higher education. The income of this fund is used to provide low-interest loans of up to \$500 to needy and gifted students of Lithuanian extraction who are pursuing a degree program at Northeastern University. Interest of 5 percent will begin to accrue when the student either withdraws or graduates from Northeastern.

Gay Miller Reese Memorial Scholarship *Boston-Bouv  College of Human Development Professions* The Gay Miller Reese Memorial Scholarship was established in 1971 by Everett Reese, in memory of his wife, and by members of the Class of 1921 at their fiftieth reunion in honor of their classmate and class president, Gay Miller Reese. This scholarship is awarded annually to help a well-qualified upperclass student in Boston-Bouv  College of Human Development Professions acquire an education that could not otherwise be possible. The recipient of this award is selected by the Committee on Scholarships.

Regional Scholarships *All Colleges* Secondary school students who reside in rural areas of New England, who have demonstrated superior achievement in their studies, and who are strongly endorsed by their principals and guidance counselors may qualify for a Regional Scholarship. Scholarships range from \$200 to \$1,400.

Myer Riesman Scholarship *College of Nursing* This fund, established in 1969 in memory of Myer Riesman, is used to provide financial assistance to deserving students in the College of Nursing. Preference is given to those students whose clinical experience is at Beth Israel Hospital.

Edward T. Rigney Scholarship *All Colleges* A fund was established in 1978 by a grant from the Trans-Sonics Foundation in memory of Edward T. Rigney, member of the Class of 1941 and co-founder of Trans-Sonics, Inc. Income is awarded annually to a student showing financial need and promise of success in his/her chosen field and who is enrolled in engineering, science, or science-related studies. The scholarship may be granted to a freshman or upperclass student and may be renewed in succeeding years.

Daniel J. and Elinor M. Roberts Endowed Athletic Scholarship Fund *All Colleges* This scholarship was established by the Northeastern University Varsity Club and friends of Daniel J. Roberts as a tribute and expression of gratitude for over 40 years of service to Northeastern University.

Daniel J. Roberts, Sr. Vice President-Treasurer, Northeastern University, Class of 1948: Daniel J. Roberts joined the faculty of Northeastern University in 1948 as an instructor of accounting and an Assistant to the Director of Student Activities. Mr. Roberts held positions as Business Manager, Assistant Director of Athletics, Director of Students and Veterans' Accounts, Bursar, Comptroller, and Director of Finance. In 1969 he was named Vice President of Finance and in 1979 elected Treasurer of Northeastern University.

Isedore Rosenthal Fund *College of Business Administration* The Isedore Rosenthal Fund was established in 1981 by Mrs. Isedore Rosenthal and friends in memory of her husband, a distinguished graduate of the School of Commerce and Finance (1925) and the School of Law (1931). Income from the fund is awarded each year, on the basis of financial need, to freshman accounting majors for the purchase of books and materials. It is the donor's desire that recipients assume the responsibility in future years to contribute to the principal of this fund, as they may be able, in order to make additional resources available for other students in later years.

Thomas A. Rosse Scholarship *College of Arts and Sciences/College of Engineering* The Thomas A. Rosse scholarship was originally established in December 1979 by the generosity of the Thomas A. Rosse family. The scholarship is awarded annually to science or engineering male student athletes who demonstrate financial need, academic stability, and soundness of character.

Susan M. Russell Scholarship *All Colleges* The fund was established in 1988 through the generosity of Sidney L. Russell, of Lynn, Massachusetts, in memory of his wife. Income from the fund is awarded to undergraduate students in the junior or senior class who demonstrate academic promise and good character but require financial assistance to achieve their educational potential.

Frank B. Sanborn Scholarship Fund *College of Engineering* The Frank B. Sanborn Scholarship Fund was established in 1958 to provide a scholarship or scholarships of not more than \$500 to worthy and needy students selected by the University, without restrictions as to race, creed, or geographic origin, but with preference being given to students majoring in electrical, mechanical, civil, or industrial engineering, in the order stated. Recipients must be willing to assume a moral obligation to reimburse the fund, as they may be able, to make similar financial aid available for other students in later years. There shall be no interest charged and no time specified for reimbursement.

Caroline M. and William J. A. Schafer Scholarship *All Colleges* This scholarship fund was established in 1988 by William T. Schafer, B.A., '31, in honor of his parents. Endowment income is to be used to provide scholarship assistance to needy students who demonstrate financial need, soundness of character, and academic stability.

Helen Seamans Schafer Scholarship *College of Business Administration* The Helen Seamans Schafer Scholarship Fund for business administration students was established by William T. Schafer, B.A., '31, as a tribute to his wife, Helen, whose love and devotion meant so much to him. Income from this fund is awarded to upperclass students in the College of Business Administration. Consideration is based on financial need, academic stability, and soundness of character.

Arnold E. Schaier Scholarship *College of Engineering* This fund was established in 1989 by Peter P. Saunders '57 and John F. Toomey '62 to honor the founder of the Norwood Engineering Company, Arnold E. Schaier '30, who first employed them as co-op students. In the spirit of the type of employees Mr. Schaier sought, this award will be made to a student enrolled in the College of Engineering who demonstrates integrity, initiative and eagerness to learn, a generous nature and loyalty. Students should also show academic stability and financial need. The award will be made annually by the Awards Committee of the College of Engineering.

Clinton H. Scovell Scholarships *Boston-Bouvé College of Human Development Professions* Scholarships are made available to men and women students in Boston-Bouvé College of Human Development Professions through a fund provided by the will of Clinton H. Scovell.

Joseph M. Segel Scholarship *All Colleges* This scholarship fund was established January 9, 1981, by Martin F. Walsh, '52, and his wife, Pauline, to honor Joseph M. Segel on the occasion of his birthday. In 1964 Mr. Segel founded the Franklin Mint, which today is the nation's largest privately owned mint. The entrepreneurial ethic of Mr. Segel is much the same as that demonstrated by many Northeastern alumni. Therefore, it is Mr. Segel's desire that recipients of this award demonstrate this quality and also show financial need.

Sidney L. Sholley Memorial Scholarship *All Colleges* The Sidney L. Sholley Memorial Scholarship has been established in memory of the founder and first president of Keystone Custodian Funds, Inc. Each year the trustees of the Sholley Foundation, Inc., provide a scholarship of \$3,500 to be awarded by the University to an outstanding incoming first-year student. The recipient is known as the Sidney L. Sholley Scholar.

George A. and Lorraine C. Snell Scholarship *All Colleges* This fund was established in 1973 by Mr. George A. Snell, a graduate of the College of Engineering, Class of 1941, and a member of the Northeastern University Corporation and Board of Trustees, and his wife, Lorraine C. Snell. The income from the fund is awarded annually to one or more students enrolled in the Basic Colleges of Northeastern University. Selection is made by the Committee on Scholarships on the basis of financial need, academic stability, and soundness of character.

Peter V. Sorgi Scholarship Fund *College of Business Administration* This fund was established in 1986 by Peter V. Sorgi, a graduate of the College of Business Administration, Class of 1943. Income from the fund will be awarded annually to one or more students enrolled in the College of Business Administration. Awards are based upon financial need, academic stability, and soundness of character.

John Stuart Sousa, Jr., Memorial Scholarship Fund *College of Pharmacy and Allied Health Professions* This scholarship was established in 1968 in memory of John S. Sousa, Jr., of Fall River, Massachusetts, a student in the College of Pharmacy, Class of 1969, by his family and friends. The scholarship is awarded annually with selection preference given to a male or female student entering his/her senior year in the College of Pharmacy and Allied Health Professions who has obtained a cumulative quality-point average of at least 2.3, demonstrates financial need, participates in extracurricular activities, and is, preferably, a member of a fraternity or sorority.

Southeastern Massachusetts Pharmaceutical Association Scholarship Fund *College of Pharmacy and Allied Health Professions* This scholarship was established in 1980 by the Southeastern Massachusetts Pharmaceutical Association. The income from the fund is awarded annually to one or more middle, junior, or senior students enrolled in the College of Pharmacy and Allied Health Professions who are residents of the area covered by the Southeastern Massachusetts Pharmaceutical Association (Greater Fall River, Greater New Bedford, and the Cape Cod areas). Recipients must be pharmacy majors and must demonstrate financial need, academic stability, and soundness of character.

Lillian M. Spelman Memorial Scholarship *College of Nursing* This scholarship was established in 1979 by a bequest from Lillian M. Spelman, a resident of Boston who, as a public health nurse, dedicated her life to helping others. Her career began in the West End of Boston in the early 1900s. She served her country unselfishly as a Red Cross nurse in Europe during the First World War. Through this scholarship she continues to help others. Scholarship recipients must exhibit financial need as well as academic stability and soundness of character.

Student Loan Fund—Health Professions *Boston-Bouvé College of Human Development Professions, College of Nursing, College of Pharmacy and Allied Health Professions* In 1974, a foundation established a perpetual loan fund at Northeastern University to benefit full-time students enrolled as middle, junior, and seniors in Boston-Bouvé College of Human Development Professions, the College of Nursing, and the College of Pharmacy and Allied Health Professions. This loan fund aids those students who have a substantial investment in and commitment to the health professions and who require some financial help to complete their preparation.

Student Loan Fund—Stop & Shop Companies, Inc. *All Colleges* Established in 1974 by the Stop & Shop Companies, Inc., the Student Loan Fund is a combination endowment and revolving fund to be funded by \$100,000. This generous gift recognizes the contribution, in human terms, made through the years by Northeastern to Stop & Shop, which at the time the Loan Fund was established counted more than 120 Northeastern men and women in its executive ranks, seven of them vice presidents. The Loan Fund assists students who have a substantial investment in their education but are in need of some financial stimulus to aid them in completing their work.

Ruth Page Sweet Scholarship Fund *Boston-Bouvé College of Human Development Professions*

This fund was established in 1959 by members of the Class of 1919 and alumnae of the Boston-Bouvé School in honor of their classmate, Miss Ruth Page Sweet, dean of women in the school from 1929 to 1946, administrative director from 1946 to 1948, and director from 1948 to 1958. The scholarship is presented to a junior or senior who has demonstrated a high level of professional promise indicated by academic record and extracurricular activities.

Frederick L. Tapper Scholarship Fund *All Colleges* This fund was established in 1987 by the wife and children of Frederick L. Tapper to commemorate his sixtieth birthday and his regard for Northeastern University. Mr. Tapper was accepted by Northeastern University in 1948 but could not attend because of a lack of funds. He did, however, achieve success in his own business and as a provider for his family. This fund was established as an expression of Frederick Tapper's admiration for Northeastern University and its mission to help students fulfill their goals, as he did. Scholarship awards from the fund are made to deserving undergraduate students who demonstrate financial need, soundness of character, and academic promise.

Sidney and Marilyn Tartarkin Scholarship Fund *All Colleges* This fund was established in 1986 in honor of Mr. Tartarkin's sixtieth birthday. Initial funds were provided by Sidney and Marilyn Tartarkin, with later contributions by family, friends, and associates. The income from the fund is awarded annually to one or more upperclass students participating in the Cooperative Plan of Education. Awards are given on the basis of demonstrable financial need, without regard to religion or race, and of an individual's desire to fulfill the potential of his or her academic ability. Preference is given to students who were without a father in junior and senior high school. It is the desire of the donors that scholarship recipients assume a moral obligation to add to this fund, as they may be able, in order to increase aid available in the future.

Alice Taylor Scholarship *All Colleges* Northeastern University recognizes that Alice Taylor, who passed away in 1982, is remembered as a positive force by the Mission Hill community and even more by the tenants of the Mission Hill Extension housing development. Because of Ms. Taylor's contributions, the University has made available to five freshmen who are residents of Mission Hill Extension full-tuition Alice Taylor scholarships for the first year.

A. Gilbert Tenney Scholarship Fund *College of Engineering—Electrical Engineering* This fund is in memory of A. Gilbert Tenney, who served as a captain in the Air Force during the Korean War and was killed while in active service. Income from the fund is awarded to a needy student or students in the field of electrical engineering studying under the Cooperative Plan of Education.

Reginald C. Thomas Memorial Scholarship *Department of Biology* This fund was established in 1988 through the generosity of Mrs. Reginald C. Thomas and her son, Royce C. Thomas, as a memorial to Colonel Reginald C. Thomas, a 1941 graduate of the College of Arts and Sciences. A distinguished scientist and teacher, Reginald Thomas was responsible for establishing the microbiology laboratory at Northeastern University. Colonel Thomas's further scholastic undertakings, his teaching credentials, and his dedication to his chosen field were recognized in his appointment as the Director of Medical Intelligence, Office of the Surgeon General, U.S. Army, a position he held until his retirement in 1972. The scholarship is awarded annually to upperclass students majoring in biology and demonstrating financial need.

Almore I. Thompson Memorial Scholarship Fund *College of Business Administration* This fund was established in 1986 in memory of Almore I. Thompson, a graduate of the College of Business Administration, Class of 1938. Mr. Thompson was a member of the Northeastern University Corporation and also served as a director of the National Council. The endowment funds were provided by members of his family and by friends. Income from the fund is awarded annually to one or more students enrolled in the College of Business Administration on the basis of financial need and satisfactory academic performance.

Earl H. Thomson Memorial Scholarship *All Colleges* This fund was established in 1971 to honor the memory of Earl H. Thomson, a distinguished alumnus of the Class of 1925. Mr. Thomson became an internationally known trademark attorney as senior partner in the firm of Thomson and Thomson. A member of the Northeastern Corporation since 1958 and a trustee of the University since 1960, he was also a director of the National Council, former president of the Northeastern Alumni Association, and a member of the board of directors of Nu Epsilon Zeta fraternity.

This scholarship is awarded annually to one or more deserving and needy students enrolled as freshmen and/or upperclass students who demonstrate a desire to fulfill the potential of their ability in academic and cooperative periods of study. The scholarship is open-ended so that

sums can be added to it in future years, and it is administered and awarded by the University without restrictions as to race, creed, geographic origin, or scholastic attainment. It would be Mr. Thomson's desire that scholarship recipients assume a moral obligation to reimburse this or other scholarship funds, as they may be able, in order to make additional financial aid available for other students in later years.

James M. Thornton Memorial Football Scholarship Fund *All Colleges* This scholarship was established by friends of James M. Thornton and by the Northeastern University Varsity Club as a tribute and expression of their love for him. A 1967 graduate, Jim had a great interest in the athletic programs of Northeastern University, Madison Park and Brookline High Schools. As an outstanding athlete, Jim played halfback on the undefeated 1963 Northeastern team and in 1982 was inducted into the Northeastern University Hall of Fame. He was the athletic director and assistant headmaster at Madison Park High School prior to his untimely death. Preference in awarding this scholarship is given to City of Boston high school and Town of Brookline schoolboy athletes.

Oliver S. Titcomb Memorial Scholarship *College of Engineering* This scholarship was established in 1987 by Dr. and Mrs. Stanley C. Titcomb, son and daughter-in-law of Oliver, a member of the Class of 1925, College of Engineering. The scholarship is awarded annually to one or more freshman students enrolled in the College of Engineering with demonstrable financial need. Preference is given to students who come from the Greater Boston area.

Gerald F. Tonks Scholarship *All Colleges* This scholarship was established in 1986 under the provisions of the will of Gerald F. Tonks to benefit undergraduate students who demonstrate satisfactory records of scholarship and genuine financial need. Mr. Tonks, who retired from Liberty Mutual Insurance Company in 1965 after 38 years of service, manifested a lifelong interest in and commitment to safety and health in the workplace. Scholarship awards, not to exceed 50 percent of the recipient's annual tuition, are to be made yearly to bachelor of science degree candidates enrolled in the College of Engineering and in selected departments within the College of Arts and Sciences and to Bachelor of Engineering Technology or associate in science degree candidates within the School of Engineering Technology.

Eliot F. Tozer Memorial Scholarship *College of Business Administration/College of Engineering* This fund was established in 1972 through the generosity of the members of the Class of 1931 in memory of their faculty adviser, Eliot F. Tozer. The scholarship of \$750 is awarded annually to students of proven need in the middler, junior, or senior classes of the day colleges of engineering or business administration. The scholarship is open-ended so that sums can be added to it in future years, and it is administered and awarded by the University without restrictions as to race or creed.

Charles Irwin Travelli Scholarships *All Colleges* Numerous scholarships have been given yearly since 1932 to students demonstrating financial need, high academic achievement, and an active interest in University life as shown by participation in one or more major activities. Students are usually honored as recipients of Travelli Scholarships at the completion of their freshman year. Under normal circumstances, these awards continue through the senior year.

Trustee Scholarships *All Colleges* Established in 1928 by the Board of Trustees of Northeastern University, these full- and partial-tuition scholarships are granted in the Basic Colleges each year to entering freshmen who have demonstrated superior scholastic attainment throughout their preparatory or high school courses.

Robert E. Turner Memorial Scholarship Fund *College of Business Administration* This scholarship fund was established in 1975 through the generosity of family, friends, and colleagues in memory of Robert E. Turner, a 1952 graduate of Northeastern's College of Business Administration who was associated with the University for 18 years. The income from this fund is awarded annually to assist a College of Business Administration undergraduate student majoring in accounting who demonstrates financial need, academic stability and soundness of character.

Samuel Ulman Scholarship Fund *All Colleges* This fund was established in 1960 by Mrs. Samuel Ulman in memory of Samuel Ulman, a student at Northeastern University from 1912 to 1915. The purpose of the fund is to provide scholarship assistance to students in good academic standing who have financial need.

University Scholarships *All Colleges* Northeastern University has for many years maintained a scholarship fund for deserving, qualified students. These scholarships are awarded on the basis of need, scholastic standing, and campus citizenship. The recipient of a Northeastern scholarship must be willing to assume a moral obligation to repay the University at some future date.

UPS Foundation Scholarship Fund *College of Business Administration* This endowed fund was established in 1952 by the UPS Foundation, the sponsored foundation of United Parcel Services, Inc. The income from this fund is awarded annually to undergraduate students enrolled in the College of Business Administration who demonstrate financial need, academic stability, and soundness of character. In providing scholarships, preference is given to students majoring in the transportation concentration or planning to enter the transportation industry.

Jessica H. Valentine Memorial Scholarship Fund *College of Nursing* This fund was established in 1985 through the generosity of the family and friends of Jessica H. Valentine, a former College of Nursing student. The income from the fund is awarded annually to a student at the college who demonstrates financial need and academic stability.

Varsity Club Hall of Fame Scholarship Fund *All Colleges* This scholarship was endowed by the Varsity Club with an initial gift of \$5,000 in 1987. The scholarship is awarded annually to a deserving athlete who demonstrates financial need, academic stability and the soundness of character that best exemplifies the Northeastern athlete.

Sabestino Volpe Scholarship Fund *College of Engineering—Civil Engineering* The Sabestino Volpe Scholarship Fund was established in 1972 through the generosity of Mr. Sabestino Volpe, a distinguished alumnus of the College of Engineering and a member of the Class of 1928. The income from the fund is awarded annually as a scholarship to an upperclass student enrolled in the day civil engineering degree program within the College of Engineering. Recipients must demonstrate financial need, academic stability, and soundness of character.

Michael F. Warchol Memorial Scholarship *College of Engineering* The Michael F. Warchol Memorial Scholarship was established in 1989 by Julia A. Warchol in loving memory of her husband, a 1936 graduate of the College of Engineering. Annual awards are made to upperclass students in the College of Engineering on the basis of financial need and academic promise. Preference is given to electrical engineering students who come from families of Polish descent or are graduates of Haverhill, Massachusetts, High School.

Henry Ellis Warren Scholarship Fund *All Colleges* This endowed fund was established in 1981 by the Warren Benevolent Fund, Inc., to honor the memory of Henry Ellis Warren of Ashland, Massachusetts. The income from this fund is awarded annually to undergraduate students who demonstrate financial need, academic stability, and soundness of character. In providing scholarships, preference is given to students from Ashland or contiguous communities.

Jacob Wasserman Scholarship *College of Pharmacy and Allied Health Professions* Established in 1966 by his friends in memory of Jacob Wasserman, this fund is to provide scholarship aid to a senior student in the College of Pharmacy and Allied Health Professions. The award will be made annually on the basis of financial need, academic performance, and personal qualities.

WCVB Boston Scholarship for a Minority Student in Broadcast Communication *College of Arts and Sciences* This scholarship was established in 1984 by WCVB-TV Boston. The income from the fund is awarded annually to a junior, senior, or graduate minority student in broadcast communication, with preference given to a black, Spanish, Oriental, or American Indian student who is economically disadvantaged and to individuals who are residents of the New England states. The recipient must be an American citizen and taking courses in newswriting and or TV news production and other required journalism courses. The scholarship is administered by the School of Journalism in conjunction with the Office of Financial Aid.

Edward R. Willett Fund *College of Business Administration* This fund was established in 1986 by Dr. Edward R. Willett, retired professor of finance, who served on the faculty of the College of Business Administration for 38 years. Financial aid awards are to be made annually to students majoring in finance who demonstrate academic achievement.

Window Shop Scholarship Fund *All Colleges* This fund was established in 1988 through the generosity of the Window Shop Scholarship Committee. The Window Shop organization was created in 1939 by a small group of talented and enterprising Cambridge, Massachusetts women, who wanted to assist refugees from Germany and Austria by providing language- and job-skills training and employment in the shop. By 1972, their mission had been accomplished and the shop building was sold, with proceeds used to establish a scholarship fund. From 1972 to 1988, many Northeastern University students benefited from this fund. In 1988, the Window Shop Scholarship Fund was terminated, and a portion of the endowment was given to Northeastern to create a new fund. Income from this fund is awarded annually to new Americans who are refugees and demonstrate financial need.

Robert W. Yesucevitz Memorial Scholarship *College of Criminal Justice* This scholarship fund was established in 1983 in memory of Robert W. Yesucevitz, a federal police officer employed by the United States Federal Protective Service. Officer Yesucevitz was killed in the line of duty while serving at the John F. Kennedy Presidential Library, and this memorial was created by his family and friends, including many police officers. The income from the fund is awarded annually to a freshman in the College of Criminal Justice who demonstrates academic promise and financial need.

Albert B. Young Scholarship *College of Pharmacy and Allied Health Professions* This fund was established in 1986 to commemorate the fiftieth birthday of Albert B. Young. Mr. Young is a 1960 graduate of the College of Pharmacy and a loyal supporter of the University. Knowing of his regard for Northeastern, his family and friends have given in his name to create an annual scholarship award for pharmacy students in their junior or senior year who demonstrate financial need, academic promise, and soundness of character.

Joseph P. Zabitski Athletic Scholarship Fund *All Basic Colleges* This fund was established by the Northeastern University Varsity Club in recognition of Joseph P. Zabitski's 35 years of service to Northeastern University. Mr. Zabitski served with high distinction as teacher, varsity athletic coach, and athletic director. His dedication, enthusiasm, and loyalty to the Northeastern student athlete provided a model for all to emulate. It is with great pride that the Varsity Club membership provides this award in his name.

Other Scholarships

The following scholarships are funded by outside sources. See the Financial Aid section, page 35, for more information.

Dr. Martin E. Adamo Award *College of Pharmacy and Allied Health Professions* This award of \$200 is given annually by the Boston Association of Retail Druggists in memory of Dr. Martin E. Adamo, the second president of the New England College of Pharmacy.

American Foundation for Pharmaceutical Education Scholarships *College of Pharmacy and Allied Health Professions* The Board of Grants of the American Foundation for Pharmaceutical Education provides \$600 to be drawn upon to aid qualified students in the upper three years who are in the upper quarter of their class and who maintain a B or higher grade average. It is understood that the students have received or are eligible to receive assistance in an amount at least equal to the grant provided by the foundation from other University sources in payment of required college expenses. The use of the grant is restricted to the payment of tuition or other required college fees. The recipients are identified as "Scholars of the American Foundation for Pharmaceutical Education."

Boston Association of Retail Druggists Romulus Dinicola Scholarship *College of Pharmacy and Allied Health Professions* This scholarship was established in 1984 to honor Romulus Dinicola and recognize his contributions to pharmacy upon his retirement from his long association with the Massachusetts State Board of Pharmacy. Preference is given to a student majoring in pharmacy who is entering his or her senior year. Selection is based on personal qualifications, need, and scholastic achievement. The initial award of \$200 was made in 1984.

Boston Society of Civil Engineers Scholarship in Memory of Desmond FitzGerald *College of Engineering—Civil Engineering* In 1931, the Boston Society of Civil Engineers established a scholarship in memory of Desmond FitzGerald, a former president of the Society and eminent hydraulic engineer with a distinguished record of service. It has been awarded annually since 1931 to an outstanding Northeastern University senior or junior student in the Department of Civil Engineering of the College of Engineering. The presentation is made by the president of the Boston Society of Civil Engineers at the Society's annual meeting in the spring.

Burroughs Wellcome Scholarship and Award Fund *College of Pharmacy and Allied Health Professions* This endowed fund was established by the Burroughs Wellcome Pharmacy Education Program to assist deserving pharmacy students in the completion of their education. Recipients are selected on the basis of need and academic promise.

William M. Cavanaugh Memorial Scholarship *All Colleges* This award, established by the members of the Publicity Club of Boston, is open to men and women of the junior and senior classes who demonstrate talent in the field of communications. The scholarship of \$100 bears the name of the second president of the Publicity Club (1950–1951), who was an able and successful newspaperman.

Civil Engineering Department Award *College of Engineering—Civil Engineering* The Civil Engineering Department Award was established by members of that department to recognize achievement and give financial assistance to a student who has selected a major in the field of civil engineering. This award, in the amount of \$100, is financed by gifts from members of the Civil Engineering Department and is awarded to the recipient at the beginning of the sophomore year.

Connecticut Alumni Rudolf O. Oberg Scholarships *All Colleges* Each year the Connecticut Alumni Club awards scholarships to students from Connecticut who have achieved a high academic average in their freshman year and have demonstrated financial need. The scholarships are to be used toward the tuition expense of the sophomore year. These scholarships were established in 1958 to promote Northeastern University among the preparatory schools of Connecticut and, in 1971, were named to honor Rudolf O. Oberg, the former director of alumni relations.

Consumer Value Stores Scholarships *College of Pharmacy and Allied Health Professions* Established in 1977, these two scholarship awards of \$750 are granted to fourth- or fifth-year pharmacy students. Recipients must demonstrate interest in community pharmacy, financial need, and involvement in student activities. Special consideration is given to students working for CVS who meet these criteria.

Jack Eckerd Corporation Scholarship *College of Pharmacy and Allied Health Professions* This \$1,000 award is given to a junior or senior student enrolled in the pharmacy curriculum. Preference is given to children of employees of the Jack Eckerd Corporation or to a person who has been employed or will be employed by the corporation.

Electrical Manufacturers Representatives Club of New England, Inc., Scholarship *Electrical Engineering* Established in 1958, this scholarship of \$475 is granted to a student or students majoring in electrical engineering, without regard to race, creed, or color. To qualify, students must have real financial need and excellent scholastic standing.

Frissora Family Scholarship Award *College of Engineering—science majors* This award was established by the Frissora family in 1972. Awards are made to first-year students entering Northeastern University on the basis of their high school scholastic record and financial need. Preference is given to students of Italian-American extraction who are pursuing an education in a technically oriented curriculum such as engineering, science, mathematics, pre-medicine, or nursing. Application for this scholarship award must be made through the Grand Lodge of Massachusetts, Order of Sons of Italy in America, 705 Cambridge Street, Boston, Massachusetts 02141. Students selected receive a grant of \$300 per year for four years. Funds are paid directly to Northeastern University.

LaVerdiere's Super Drug Stores Scholarships *College of Pharmacy and Allied Health Professions* Established in 1976, these two \$500 awards are offered to students who have completed two or more full years in the pharmacy curriculum, who are graduates of either a Maine or a New Hampshire high school, and who are deserving of financial assistance.

McKesson & Robbins, Inc., Award *College of Pharmacy and Allied Health Professions* This plaque, given annually by McKesson & Robbins, Inc., is awarded to a pharmacy major. The award recipient is determined by the College of Pharmacy Scholarship Committee.

Massachusetts State Pharmaceutical Association Award *College of Pharmacy and Allied Health Professions* This scholarship of \$200, established by the Massachusetts State Pharmaceutical Association, is awarded annually. The recipient must be a resident of Massachusetts.

Medical Laboratory Science Alumni, Faculty, and Student Club Scholarships *College of Pharmacy and Allied Health Professions—Medical Laboratory Science* Each year, the Medical Laboratory Science Program awards these three \$100 or more scholarships to promising students in the Medical Laboratory Science undergraduate programs.

National Association of Chain Drug Stores (NACDS) Education Foundation Scholarship *Pharmacy* This scholarship was established in 1985 to support undergraduate pharmacy education and encourage talented students to pursue careers in community pharmacy practice. Preference is given to pharmacy students in the second or third professional year of study and those who have expressed interest in the community practice of pharmacy.

New England Paper Merchants, Inc. Scholarship *All Colleges* Established in 1959 by the New England Paper Merchants Association, Inc., this is an annual scholarship awarded to a junior or senior who has demonstrated by cooperative work achievement and extracurricular activities an interest and potential in the field of sales. The recipient must be of high character, be able to demonstrate financial need, and have a good academic record.

Norfolk County Pharmaceutical Association Scholarship *College of Pharmacy and Allied Health Professions* This scholarship of \$50 is awarded annually to a student who meets the requirements both financially and scholastically and is a resident of one of the member towns covered by the Norfolk County Pharmaceutical Association (Norwood, Dedham, Canton, Walpole, Millis, Needham, Westwood, and Islington, in Massachusetts).

Charles I. Haley Phi Kappa Phi Scholarship *All Colleges* Established in 1982 by the University's Chapter of Phi Kappa Phi, the national interdisciplinary honor society, the scholarship is available to a student transferring from Roxbury Community College. The nomination is made by the president of Roxbury Community College in accordance with criteria established by the University's chapter.

Revco Foundation *College of Pharmacy and Allied Health Professions* Established in 1985, this \$500 donation to the College of Pharmacy Scholarship Fund is used to aid a pharmacy student deserving of financial assistance.

Rite Aid Corporation Scholarships *College of Pharmacy and Allied Health Professions* The purpose of this award, established in 1977, is to assist senior pharmacy students in completing their training in pharmacy. The students should demonstrate financial need, personal qualifications, and good academic records.

Ernest L. Spencer Scholarship Award *College of Engineering—Civil Engineering* Established in 1975 by the family and friends of Ernest L. Spencer as a memorial, this award is administered by Chi Epsilon, honor society for civil engineers. Professor Spencer, chairman of the Civil Engineering Department from 1963 until his death in 1975, was a member of the Northeastern University faculty for 36 years. At present, income from the endowment provides an annual award of \$500. Nominees are selected from the senior class of civil engineering students by the department scholarship committee. Criteria on which the award is based include high academic achievement, active participation in student affairs, and evidence of superior professional promise as demonstrated by high evaluations on cooperative work assignments.

Springfield Druggists' Association Scholarship *College of Pharmacy and Allied Health Professions* A scholarship of \$100 is offered by the Springfield Druggists' Association, to be awarded to a sophomore or junior who maintains the highest average in the Department of Pharmacy and who is worthy and in need of financial assistance. The Springfield Druggists' Association Scholarship Fund was established in 1956.

Gifts and Bequests to Northeastern University

Northeastern University welcomes scholarships, gifts, and bequests to further its educational purposes. It is recommended that those contemplating gifts or bequests confer with the Office of Development regarding the needs of the University.

Planned gifts to the University can often be combined with personal financial goals to produce maximum financial security as well as significant tax savings for an individual or family. A member of the Northeastern University development staff will be happy to consult with those considering a gift or bequest.

The legal name of the University is "Northeastern University." In making a gift or bequest, it is recommended the following wording be used: "Northeastern University, an educational institution incorporated under the laws of Massachusetts and located in Boston, Massachusetts."

Honor Societies and Awards

Honor Societies

The University encourages the achievement of excellence in scholarship by making monetary awards and chartering honor societies in the various academic disciplines. The following honor societies are chartered in the colleges:

The Academy College of Arts and Sciences

Alpha Phi Sigma College of Criminal Justice

Alpha Pi Mu College of Engineering, Department of Industrial Engineering and Information Systems

Beta Alpha Psi College of Business Administration, accounting concentration

Beta Gamma Sigma College of Business Administration (Massachusetts Delta Chapter)

Boston-Bouvé College of Human Development Professions Honor Society, Boston-Bouvé College of Human Development Professions, all departments

Chi Epsilon College of Engineering, Department of Civil Engineering

Eta Kappa Nu College of Engineering, Department of Electrical Engineering (Gamma Beta Chapter)

Eta Sigma Gamma Boston-Bouvé College of Human Development Professions, Department of School and Community Health Education

Kappa Delta Pi Boston-Bouvé College of Human Development Professions

National Honor Society of Scabbard and Blade Reserve Officers' Training Corps

Omega Chi Epsilon College of Engineering, Department of Chemical Engineering

Phi Alpha Theta College of Arts and Sciences, Department of History (Northeastern Zeta Tau Chapter)

Phi Kappa Phi National interdisciplinary honor society, all Basic Colleges

Phi Sigma College of Arts and Sciences, Department of Biology

Pi Sigma Alpha College of Arts and Sciences, Department of Political Science (Northeastern Delta Gamma Chapter)

Pi Tau Sigma College of Engineering, Department of Mechanical Engineering (Northeastern Tau Chapter)

Rho Chi Society College of Pharmacy and Allied Health Professions (Beta Tau Chapter)

Sigma Epsilon Rho University College

Sigma Pi Sigma College of Arts and Sciences, Department of Physics

Sigma Theta Tau College of Nursing

Tau Alpha Pi School of Engineering Technology (national engineering technology honor society)

Tau Beta Pi College of Engineering (Massachusetts Epsilon Chapter)

Election to the college honor societies is based primarily on scholarship, but, before a man or woman is privileged to wear the honor society insignia, there must be evidence of integrity of character. The societies have memberships consisting of the outstanding men and women in the colleges. Election to an honor society is among the highest honors that can be conferred on an undergraduate.

Awards for Upperclass Students

University awards are determined by scholastic and citizenship achievement. They are presented by appropriate committees headed by the dean of students.

Academy Award *College of Arts and Sciences* The Academy, the honor society of the College of Arts and Sciences, offers an annual award of \$100 to the sophomore in the College of Arts and Sciences who, during the previous year, achieved the highest scholastic record.

William Jefferson Alcott, Jr., Award *All Colleges* This award of \$200 was established in 1934 by members of the faculty and other friends to perpetuate the memory of William Jefferson Alcott, Jr., a brilliant member of the Northeastern Department of Mathematics from 1924 until his death in 1933. The annual award to a senior is made from the income of the fund "for outstanding performance, either in the way of unusual excellence in routine work or in connection with some intellectual activity outside or beyond the requirements of the curriculum."

Alumni Awards for Professional Promise *All Colleges* Established in 1947 by the Alumni Association, these awards are presented annually at an Alumni Association meeting in the spring of the year. The awards are made to the outstanding seniors in each of the Basic Colleges, in the University, and in the School of Engineering Technology who have demonstrated unusual professional promise through their character traits, scholastic achievement, and cooperative work performance.

Beta Gamma Sigma Society Award *College of Business Administration* "The purpose of this society shall be to encourage and reward scholarship and accomplishment among students of business administration, to promote the advancement of education in the art and science of business, and to foster integrity in the conduct of business operators." Election to membership in Beta Gamma Sigma is the highest scholastic honor open to a student in business administration. The Massachusetts Delta Chapter of Beta Gamma Sigma, the national honor society of colleges of business administration, offers an annual scholarship of \$100 to the sophomore in the College of Business Administration who, during the previous year, achieved the highest scholastic record.

Eugene J. Blackman Theatre Scholarship *College of Arts and Sciences* This scholarship fund was established in 1988 by former students, members of The Silver Masque (the student theatre club), friends, and colleagues of Professor Eugene J. Blackman to honor his 41 years of dedicated service to Northeastern University and its students. Professor Blackman served as a member of the faculty of the Department of English and for many years as chairman of the Department of Drama, Speech, and Music, which later became the Department of Theatre and Dance. Through his efforts, generations of students and members of the Northeastern community received a much greater appreciation for theatre and the performing arts.

The chairman of the Department of Theatre and Dance makes the annual selection for the award of the Eugene J. Blackman Theatre Scholarship. Candidates must show outstanding promise in theatre. (Candidates may include entering freshmen.)

Boston-Bouvé College of Human Development Professions Honor Society Awards *Boston-Bouvé College of Human Development Professions* The society offers an annual award of \$100 to the sophomore in Boston-Bouvé College of Human Development Professions who, during the previous year in the College, achieved the highest scholastic record. Each student voted into the society receives an engraved certificate at a special Honors Assembly.

Class of 1986—Greg Jarvis Memorial Scholarships *All Colleges* This fund was established by the Class of 1986 in memory of Greg Jarvis, a Northeastern alumnus who was a crew member aboard the space shuttle *Challenger* when it was tragically destroyed in 1986. The scholarship is awarded annually to two students who, in their previous three academic quarters, have displayed leadership qualities in extracurricular activities while maintaining at least a 2.5 quality-point average. It is in this context that the Class of 1986 feels the recipients will reflect the perseverance, integrity, spirit, and pride that Mr. Jarvis exemplified.

Sears B. Condit Honor Awards *All Colleges* These awards were established in 1940 through the generosity of Sears B. Condit. On Honors Day, Sears B. Condit Honor Awards are presented annually to outstanding students in the senior class. Each award carries a stipend as well as a certificate of achievement.

Joseph Arthur Coolidge Achievement Awards *College of Arts and Sciences—Physical Sciences*

Established in 1977 with funds provided by the will of Joseph A. Coolidge, a distinguished member of the Northeastern University faculty from 1911 to 1954 and chairman of the Department of Physics from 1912 to 1935, three awards of \$500 each are granted annually to the outstanding sophomore, middle, and junior physical sciences students. These awards are based primarily on distinguished academic achievement, with additional consideration given to soundness of character, participation in extracurricular activities on and off campus, and qualities of leadership. Preference is given to students majoring in physics, mathematics, or other physical sciences.

Cooperative Education Awards *All Colleges* These awards are presented to seniors in the Basic Colleges in recognition of outstanding performance in the Cooperative Education Program, through which they have personified the objectives and ideals of the University. The awards are presented at the Annual Awards Luncheon.

Richard Cardinal Cushing Scholarship *All Colleges* The Richard Cardinal Cushing Scholarship was established in 1978 through the generosity of the Massachusetts Committee of Catholics, Protestants, and Jews. The income from the scholarship's endowment is awarded annually to a Catholic, a Protestant, and a Jewish student who embody the principles of equality and justice and who, through their work on campus, have become positive forces for religious understanding.

Director's Award *All Colleges* The Director's Award of \$100 is made annually by the director of the African-American Institute to the individual judged by the director to be the most outstanding black senior. The award is based on involvement in African-American Institute programs and scholarship as well as interaction with the community at large. The award is presented at the Awards and Unity Banquet in June.

Alfred J. Ferretti Award *College of Engineering—Mechanical Engineering* Tau Kappa Chapter of Pi Tau Sigma, the mechanical engineering national honor fraternity, sponsors an annual award to the sophomore mechanical engineering student at Northeastern having the highest scholastic standing. The award is named in honor of Professor Ferretti, who retired June 30, 1961, after 43 years of service to the University.

Alfred J. and Laura M. Ferretti Scholarship *College of Engineering—Mechanical Engineering* This scholarship was established in 1978 by Professor Alfred J. Ferretti, who retired in 1961 after 43 years of service to Northeastern University. It honors the memory of Mrs. Ferretti and is to benefit worthy undergraduate students who are majoring in mechanical engineering. Recipients should demonstrate high academic achievement by maintaining a minimum average of 3.25 and should be of sound character.

Luis de Flores Endowment Fund *All Colleges* This fund was established in 1964 to provide yearly awards to students in recognition of superior ingenuity, irrespective of general academic standing.

Clara and Joseph F. Ford Awards *All Colleges* The Ford Awards are made to students who have shown a democratic and tolerant spirit and who are well disposed toward people of all creeds and races. They are chosen from the senior class and judged on the basis of their contributions through participation or leadership and their extracurricular organizations. Students must have demonstrated by their actions that they are particularly tolerant and willing to work with and for other people.

Lillian Gilbreth Award *College of Engineering—Industrial Engineering and Information Systems* A cash award is presented at the annual Engineering Honors Banquet to the outstanding senior in the Department of Industrial Engineering and Information Systems. Named in honor of the first woman industrial engineer, the award was established in 1986 by Carolyn M. Jack, a 1984 graduate, to recognize academic excellence and service to the University and the community. The recipient is selected by the department chairman and the faculty adviser as well as the president of the Alpha Pi Mu honor society.

Harold D. Hodgkinson Achievement Awards *All Colleges* Established in 1954, the Harold D. Hodgkinson Achievement Awards of \$1,000 each are granted annually to two senior students. The winners of the awards are known as the Hodgkinson Scholars for the year in which they are chosen. The award is based primarily upon distinguished scholastic achievement, with due consideration of character, personality, qualities of leadership, cooperative work experience, military record (if any), and service in voluntary organizations and activities. Student

leadership accomplishments and professional potential are evaluated in connection with these criteria. The Hodgkinson Scholars are chosen by a committee of administrative members of the faculty. An appropriate certificate is presented to each recipient as a permanent record of his or her selection.

Kappa Delta Pi Award *Boston-Bouvé College of Human Development Professions* Kappa Delta Pi honor society offers an annual award of \$100 to the sophomore who, during the previous year, achieved the highest scholastic record.

Robert D. Klein Memorial Scholarship *College of Arts and Sciences* This scholarship was established in 1981 through the generosity of family, friends, and colleagues of Professor Klein, who joined the Northeastern University faculty in 1957, served as acting chairman of the Department of Mathematics between 1969 and 1970 and, from 1977 until his death in 1978, was a professor of mathematics. The scholarship is awarded annually to a first-year student enrolled in the College of Arts and Sciences who demonstrates consistent effort and academic achievement in remedial mathematics, the educational program to which Professor Klein contributed so significantly.

Joseph C. Lawler Memorial Scholarship *College of Engineering—Civil Engineering* This scholarship was established in 1982 by family, friends, and colleagues in memory of Joseph C. Lawler, an alumnus of the College of Engineering, Class of 1943, and a recipient of a University honorary degree in 1972. Mr. Lawler was a member of Northeastern's Corporation and Board of Trustees. He was chairman and chief executive officer of Camp Dresser & McKee, Inc., the firm where he began his employment as a co-op student of Northeastern. A \$2,000 award will be made annually to an upperclass (middles, junior, or senior) full-time undergraduate civil engineering day student who demonstrates exceptional professional promise. Criteria include academic performance, cooperative employer recommendations, demonstrated leadership abilities, and/or community service activities.

Lilly Achievement Award *College of Pharmacy and Allied Health Professions* The Lilly Achievement Award is given to a graduating senior for superior scholastic and professional achievement. Leadership qualities, professional attitudes, and academic performance will be considered in the selection of the individual for this award.

McKesson & Robbins, Inc., Scholarship *College of Pharmacy and Allied Health Professions* This scholarship of \$200, given annually by McKesson & Robbins, Inc., is awarded to a worthy student in financial need.

Susan L. Orchard Memorial Fund *All Colleges* In 1978, the Susan L. Orchard Memorial Fund was established at Northeastern in memory of Susan L. Orchard, a former University student. Reflecting Susan's interest in improving the quality of life and opportunities for women, the annual income of this fund is awarded to mothers pursuing their studies at Northeastern who require financial assistance in order for their children to make use of the University's day-care center. Recipients are selected by the center's director and advisory committee.

Phi Sigma Society Award *College of Arts and Sciences* Phi Sigma, honor society in the Department of Biology, offers an annual award of \$50 to the junior or senior majoring in biology or a related science who demonstrates the greatest research potential. To qualify for the award, the student must be a member of Phi Sigma.

Roland Guyer Porter Memorial Fund *College of Engineering—Electrical Engineering* This fund was established in 1953 by colleagues and friends of the late Professor Roland G. Porter, for many years the head of the Department of Electrical Engineering. Interest from the fund provides an annual award to a student in the Department of Electrical Engineering who best exemplifies the qualities of mind and character that Professor Porter did so much to develop in his lifetime.

President's Awards *All Colleges* On the annual Honors Day, six awards of \$500 each, known as the President's Awards, are presented to the students with the highest records in both divisions of the middles, junior, and senior classes.

William Rand Award *College of Engineering* The Massachusetts Epsilon Chapter of Tau Beta Pi annually offers an award to the outstanding middle in the College of Engineering. The award is based upon outstanding scholarship, breadth of interest, and contribution to the University. All middles with a 3.5 average or above are eligible; the winner is chosen after careful screening and interviews with members of the chapter.

ROTC Awards *Department of Military Science—ROTC* Awards totaling \$1,000 are available to ROTC cadets each year. The University offers ten \$50 awards annually: four to sophomores, four to middlers, and two to juniors.

Scabbard and Blade (the cadet officers' honor society) offers one award annually to middlers. The Pershing Rifles (the basic-course honor society) offers a \$50 award to a sophomore Pershing Rifles cadet.

Academic Achievement Awards are won by each cadet in the top 10 percent of ROTC classes. This award, a wreath, is worn above the right breast pocket of the uniform during the year immediately following the year it is earned. Leadership Achievement Awards, consisting of letters of commendation, are awarded to each cadet in the top 10 percent in leadership potential. Many medals and trophies are also awarded by other organizations to ROTC cadets for achievements in diverse fields.

Nguzo Saba Award *Office of Minority Students Affairs* Two Nguzo Saba Awards are presented each year by the African-American Institute to the black male and female who have proved themselves of invaluable service to the black community of Northeastern University and Boston. The award is in the amount of \$100 and is presented at the Awards and Unity Banquet.

Sigma Theta *College of Nursing* Sigma Theta, the honor society in the College of Nursing, annually offers an award of \$100 to the sophomore in the College of Nursing who, during the previous year, achieved the highest scholastic record.

Professor Joseph Spear Fund for Excellence in Student Activities *All Colleges* This fund was established by the College of Engineering Class of 1923 in recognition of Professor Spear, class adviser and mentor. It was through Professor Spear's devotion and concern for the well-being of the students that he developed and promoted student activities at Northeastern University. Professor Spear has been referred to as the "father of student activities." The purpose of this fund is to provide a source of income that can be awarded annually to juniors and seniors who have made outstanding contributions to student activities.

Max Starr Award *College of Business Administration* The Max Starr Award in Public Accounting was established in 1968 by the Max Starr Foundation to recognize every other year an outstanding member of the junior class in the College of Business Administration preparing for a career in public accounting. The recipient is chosen on the basis of both academic and cooperative work records as well as personal qualities. The student receives an award of \$250.

Dr. Ruth E. Sullivan Memorial Scholarship Fund *College of Arts and Sciences* This fund was established at Northeastern University in 1976 through the generosity of family, friends, and colleagues of Dr. Sullivan, who was a member of the Department of English from 1968 until her death in 1976. One scholarship is awarded annually to an undergraduate senior who demonstrates academic achievement and excellence in interdisciplinary studies in the liberal arts, such as literature and psychology, the fields to which Dr. Sullivan contributed so significantly.

Tau Beta Pi Award *College of Engineering* Massachusetts Epsilon Chapter of Tau Beta Pi Association, the national honor society in engineering, annually offers a scholarship of \$100 to the sophomore in the College of Engineering who, during the previous year, made the highest scholastic record.

Index

Index

- Academic Assistance Center, 217
- Academic Computing, Division of (DAC), 221
- Academic policies, 48–50
- ACCESS*, 221
- Accounting concentration, 117–118
 - graduate program, 207
- Administrative officers, 237–238
- Admissions, 10–24
 - conferences and interviews, 11
 - Department of, 10
 - entrance requirements and examinations, 13–15
 - entry dates and applications, 15–16
 - international students, 21–22
 - student information, 12
 - transfer students, 22–23
- Adult education, 203–204
- Advanced Placement, 15
 - transfer students, 22
- Advising. *See also* Tutoring
 - Counseling and Testing Center, 15, 218–219
 - Disability Resource Center, 219–220
 - faculty, 55, 202
 - International Student Office, 222
 - Office of Freshman Affairs, 223
 - Office of Minority Student Affairs, 223
 - preprofessional, 224
- Aerospace Co-op Program, 161
- African-American Institute, 20, 21
- African-American Master Artists-in-Residency Program, 92
- African-American Studies, Department of, 74
- Alternative Freshman-Year Program, 16–17, 190–192
- Alumni Association, 217–218
- Alumni Relations, Office of, 218
- Ambassador Awards, 22
- American Sign Language programs, 90–91
 - visiting students, 91
- Anatomy Library, 99
- Anthropology. *See* Sociology/
 - Anthropology, Department of
- Applied Social Research, Center for, 211
- Archives, 215
- ARENA* Review, 218
- Art and Architecture, Department of, 56–57
- Artificial Intelligence Laboratory, 152
- Arts and Sciences, College of, 13, 14, 52–55
 - administrative faculty, 52
 - American Sign Language programs, 90–91
 - Co-op, 16, 53
 - core curriculum, 54
 - Dean's Office, 55
 - faculty advisers, 55
 - foreign language requirement, 54–55
 - graduate programs, 205
 - interdisciplinary minors, 88–90
 - international programs, 86–88
 - research activities, 209
 - special programs, 91–93
 - student services, 55
- Arts and Sciences Divisions, 56–86
 - Humanities, 59–65
 - Performing and Visual Arts, 56–59, 92–93
 - Sciences and Mathematics, 65–73
 - Social Sciences, 73–86
- Asian Studies, Center for, 87, 211
 - minor, 88
- Associate degrees. *See* Part-time programs
- Athletics. *See* Health, Sport, and Leisure Studies, Department of; Sports
- Athletic Training Laboratory, 99

Athletic Training Program, 103–104
Attendance and academic discipline, 50
Awards, 263–266. *See also* Financial
Aid; Scholarships and grants

Bacon Memorial Chapel, 225
Barletta Natatorium, 7, 99, 231
Barnett Institute of Chemical Analysis
and Materials Science, 211
Basic College Compensatory Programs,
198–199
Biology, Department of, 65–67
Biology Undergraduate Advisory Book,
The, 66
Biomedical Engineering Program,
156–157
Blackman Auditorium, 7
Bookstore, 33
Boston-Bouv  College of Human
Development Professions, 13, 14, 97–100
administrative faculty, 97
facilities, 99
graduate programs, 205
insurance and medical requirements,
100
licensure and certification, 100
research activities, 209
Boston-Bouv  departments, 100–112
Education, 100–102
Health, Sport, and Leisure Studies,
102–109
Human Services, 111–112
Physical Therapy, 109–111
Boston Library Consortium, 217
Boston Lyric Opera Company (BLO), 93
Building and Construction Technology
Program, 203
Bunche Scholars Program, 20
Business Administration, College of, 13,
113–117
accreditation, 117
faculty groups, 113–114
freshman-year courses, 117
graduate programs, 205–206
interdisciplinary minor, 88

minor, 116
research activities, 209
Business Administration concentrations,
117–127
Accounting, 117–118
Entrepreneurship and Small Business
Management, 118–119
Finance and Insurance, 119–121
Human Resources Management,
121–122
International Business, 123–124
Logistics and Transportation,
124–125
Management, 125–126
Management Information Systems,
126–127
Marketing, 127

Cabot Physical Education Center, 7, 99,
231
Calendar, Academic, 1–2
Call Children's Center, 99
Cardiopulmonary Sciences, Department
of, 177–178
Cardiovascular Health and Exercise
Program, 104–105
Career counseling. *See* Advising
Career Development and Placement,
Department of, 219
Career Resource Center, 219
Certification. *See* Teacher certification
Chapel, Bacon Memorial, 225
Chemical Engineering, Department of,
144–145
Chemistry, Department of, 67–68
Chemistry at Northeastern, 68
Children's Center, 99
Cinema Studies minor, 89
Civil Engineering, Department of,
146–148
Clubs, student, 229–230
Club Sports Program, 231
College Board examinations, 14
College-Level Examination Program
(CLEP), 15

- transfer students, 22
- College Visit Program, 11
- College Work-Study Program, 38
- Committees, University, 239
- Communications Research Laboratory, 99
- Compensatory Programs, Basic College, 198–199
- Computer Engineering. *See* Electrical and Computer Engineering, Department of
- Computer Science, College of, 13, 128–136
 - accreditation, 131
 - B.A., 130
 - Co-op, 16, 131–136
 - faculty, 128
 - graduate programs, 206
 - minor, 130
 - research activities, 209–210
- Computer Technology Program, 163–164
- Computing Resource Center (CRC), 143, 162, 221
- Continuing Education, Division of, 203–204
- Cooperative Education, Center for, 211
- Cooperative Education Research Center, 212
- Cooperative Plan of Education (Co-op), 26–28, 30
 - Department of, 27
 - Four-Year Option, 16, 135–136, 141
 - international programs, 28, 87
 - Three-Year Option, 179
- Costs. *See* Fees; Tuition
- Counseling. *See also* Advising; Tutoring
 - disabled students, 219–220
 - international students, 222
- Counseling and Testing Center, 15, 218–219
- Credit system, 48
 - transfer students, 23
- Criminal Justice, College of, 14, 137–139
 - elementary Spanish, 91
 - faculty, 137
 - freshman-year courses, 139
 - graduate programs, 206
 - research activities, 210
- CSSS Digest*, 218
- Cullinane Hall, 7
- D**
 - DAC (Academic Computing, Division of), 221
 - Dana Research Center, 7, 73
 - Dance. *See* Theater and Dance, Department of
 - Dance Theatre, 108
 - Day care, 99
 - Deaf student services, 220
 - American Sign Language programs, 90–91
 - Deaf studies specialization, 90
 - Dean's List, 48–49
 - Deferred Admission Plan, 16
 - Dental Hygiene Program, 187–189
 - Departmental student organizations, 229
 - Digital Signal Processing, Center for, 211–212
 - Dining Service. *See* Meal plans
 - Directed study, 64
 - Disability Resource Center (DRC), 219–220
 - Disabled Student Organization, 220
 - Dockser Hall, 99
 - Dormitories. *See* Housing
 - Double majors, 53, 101
 - E**
 - Early Admission Plan, 16
 - Early Childhood Education Program, 101
 - East/West Marine Biology Program, 87
 - Economics, Department of, 75–76
 - Education, Department of, 100–102
 - dual major in elementary education, 101
 - speed reading, 225
 - Electrical and Computer Engineering, Department of, 148–151
 - Electrical Engineering Technology Program, 165–166

- Electromagnetics Research, Center for, 212
- Electron Microscopy Center, 67, 212
- Elementary Education Program, 101
- Ell Presidential Scholarship Program, 19
- Ell Student Center, 7, 228–229
 - services fee, 32
- Employment opportunities, 36
- Engineering, College of, 13, 140–143
 - accreditation, 143
 - administrative faculty, 140
 - B.S./M.S. joint degree, 20, 142
 - chapters of professional societies, 143, 147
 - Four-Year Co-op Option, 16, 141
 - freshman-year courses, 143
 - graduate programs, 206
 - part-time programs, 142, 202
 - research activities, 210
 - student services, 142–143
- Engineering programs, 144–158
 - Biomedical Engineering, 156–157
 - Chemical Engineering, 144–145
 - Civil Engineering, 146–148
 - Electrical and Computer Engineering, 148–151
 - General Engineering, 157–158
 - Industrial Engineering and Information Systems, 152–153
 - Mechanical Engineering, 154–156
- Engineering Student Services Office, 142
- Engineering Technology, School of, 13, 159–163
 - accreditation, 161
 - Aerospace Co-op Program, 161
 - computer and laboratory facilities, 161–162
 - faculty, 159
 - freshman-year courses, 163
 - part-time programs, 161, 202–203
 - research activities, 210
 - student services, 162
- Engineering Technology programs, 163–167
 - Aerospace, 161
 - Computer Technology, 163–164
 - Electrical Engineering Technology, 165–166
 - Mechanical Engineering Technology, 166–167
- Engineering Technology Student Services Office, 162
- English, Department of, 60–61
 - Freshman writing requirement, 54
- English-as-a-Second Language
 - Intensive English Program, 221
 - proficiency requirement, 18
- English composition. *See* Writing
- English Language Center, 18, 221–222
- Entrance requirements. *See* Admissions
- Entrepreneurship and Small Business
 - Management concentration, 118–119
- Episcopal College Work Center, 225
- Escort security service, 46
- Essays on Modern Music*, 93
- Examinations
 - CLEP, 15, 22
 - College Board, 14–15
 - end-of-quarter, 48
- Exchange programs. *See* International Exchange programs
- Executive Development Program, 206
- F**
 - Family Education Loans, 37
 - Favat Center, 99, 215
 - Federal assistance programs, 38–39
 - Fees, 30–33
 - deposits and refunds, 23, 34, 43
 - Fenway Project, 79
 - Field Studies, School for, 88
 - Finance and Insurance concentration, 119–121
 - Financial Aid, 35–40. *See also* Awards; Scholarships and grants
 - community grant programs, 16
 - eligibility and applications, 36–37
 - Office of, 35, 37
 - state and federal programs, 37–39
 - Foreign students. *See* International students

- Forsyth Dental Center, 187
- Four-Year Co-op Option, 16
 - Computer Science, 135–136
 - Engineering, 141
- Fraternities, 230
 - housing, 45
- French, 87
- Freshman Affairs, Office of, 223
- Freshmen
 - Alternative Freshman-Year Program, 16–17
 - English requirement, 54
 - entrance examinations, 14–15
 - financial aid, 36–37
 - mathematics placement test, 54
- General Engineering Program, 157–158**
- Geology, Department of, 69
- German, 86–87
- Governing boards and officers, 234–236
- Grades, 48
- Graduate and Professional Schools, 205–207
- Graduate Placement Services, Department of, 224
- Grants. *See* Awards; Financial Aid; Scholarships and grants
- Guidance Information System (GIS), 219
- Guide to Northeastern University Libraries*, 216
- Hayden Lodge, 99**
- Health, Sport, and Leisure Club, 109
- Health, Sport, and Leisure Studies, Department of, 102–109
 - Athletic Training, 103–104
 - Cardiovascular Health and Exercise, 104–105
 - Physical Education Teacher Preparation, 105–106
 - Recreation Management, 106–107
 - School and Community Health Education, 107–109
- Health-Care Curriculum Open Option Program, 186–187
- Health Center, 24, 225–226
- Health Information Administration Program, 175–176
- Health Professions Center, 174
- Health Professions Loan, 38
- Health Services, 24, 225–226
 - fees, 32, 226
- Hearing, Language, and Speech Center, 99, 222
- HELP Legal Services, 222
- Hillel House, 225
- History, Department of, 76–77
- Honors list, 49
- Honor societies, 262
- Honors Program, 18–19
- Housing, 42–46
 - applications and license agreement, 43
 - costs, 31, 44
 - deposits and refunds, 23, 32, 34, 43
 - fraternity, 45
- Human Development. *See* Boston-Bouvé College of Human Development Professions
- Human Gross Anatomy Library, 99
- Humanities Division, 59–65
 - English, 60–61
 - Modern Languages, 61–62
 - Philosophy and Religion, 62–63
 - Speech Communication, 64–65
- Human Resources Management
 - concentration, 121–122
- Human Services Newsletter*, 79
- Human Services Program, 77–79, 111–112
 - elementary Spanish, 91
- ID card, 32**
- Industrial Engineering and Information Systems, Department of, 152–153
- Infirmery, 226
- Insurance, health and liability, 32
- Insurance and Financial Services Institute, 203
- Insurance and Risk Management
 - specialization, 120

Intensive English Program, 221
 Interdisciplinary minors, 88–90
 Interim Academic Status Report system, 223
 International Baccalaureate, 22
 International Business concentration, 123–124
 International Exchange programs
 Co-op, 28, 87
 Moscow State University, 86
 International Student Forum (ISF), 222
 International Student Office (ISO), 222
 International students, 21–22
 advanced standing credit, 22
 Co-op, 28
 English Proficiency Test, 18
 fee, 32
 transferring, 23
 International study programs, 86–88
 Internship Program, 64
 Interpreter Education Project, 90
 Intramural Sports Program, 230
 Investment and Management Analysis
 specialization, 120
 Ireland: North and South Program, 86
 Irish Studies Program, 88

J
 Journalism, School of, 14, 95–96
 research project, 210
Journal of Sport and Social Issues, 218
 Journals, Arts and Sciences, 93–94

K
 Kassabian Athletic Training Laboratory, 99

L
 Labor Market Studies, Center for, 212
 LAMP (liberal arts major preference), 53, 55
 Lane Health Center, 24, 225–226
 Language Laboratory, 215
 Languages. *See* Modern Languages,
 Department of
 Law, School of, 206–207

B.A. or B.S./Juris Doctor Degree
 Program, 20
 research activities, 210
 League of Composers—International
 Society for Contemporary Music, 93
 Learning-disabled students, 13
 services, 220
 Learning Resources Center, 99, 215
 Liability insurance, 32
 Liberal arts. *See* Arts and Sciences,
 College of
 Liberal arts major preference (LAMP),
 53, 55
 Libraries, 214–217
 Anatomy, 99
 Archives, 215
 children's literature, 99
 F. André Favat Center, 215
 Lupean, 99
 Main, 215
 Media Center, 215
 Linguistics Program, 79–80
 ASL concentration, 90
 minor, 89
 Loans, 37–39. *See also* Awards;
 Financial Aid; Scholarships and Grants
 Logistics and Transportation
 concentration, 124–125
 Lupean Professional Library, 99
 Lutheran Center, 225
lynx communication system, 221

M
 Main library, 215
 Majors, choice of, 15
 double, 53, 101
 Management concentration, 125–126
 Management Development, Center for,
 206
 Management Information Systems
 concentration, 126–127
 Management of Financial Institutions
 specialization, 121
 Management Workshops, 206
 Managerial Finance specialization, 121

- Manufacturing and Robotics Laboratory, 152
- Marine Science Center, 87, 209, 212
 - summer program, 91
- Marine Studies
 - Massachusetts Bay Consortium, 91
 - minor, 89
- Marketing concentration, 127
- Math Center, 55
- Mathematics, Department of, 70–71
 - freshman placement test, 54
- Matthews Arena, 7, 231
- Meal plans, 31, 34, 44
- Mechanical Engineering, Department of, 154–156
- Mechanical Engineering Technology Program, 166–167
- Media Center, 215, 216
- Media Production Laboratory, 216
- Media Studies minor, 89
- Medical Laboratory Science (Medical Technology), Department of, 179–181
 - certification, 180
 - Three-Year Co-op Program, 179
- Microcomputer laboratories, 152, 216
- Microprocessor Laboratory, 153
- Middle-Year Writing Requirement, 49, 54
- Military Science, Department of, 193
- Minorities in Engineering (NUPRIME) program, 142
- Minority Student Affairs, Office of, 223
- Minority students, 20–21
- Minors, interdisciplinary, 88–90
- Modern Languages, Department of, 61–62
 - international programs, 86–87
- Mugar Life Sciences Building, 174
- Music, Department of, 57–58
 - League—International Society for Contemporary Music, 93
 - New England Composers Orchestra, 93
 - New England Conservatory affiliation, 92
- Natatorium, Barletta, 7, 99, 231
- Network Northeastern, 203–204
- New England Composers Orchestra (NECO), 93
- New England Conservatory affiliation, 92
- New England Press Association (NEPA), 96
- New England Quarterly*, 93
- Nineteenth-Century Contexts*, 94
- Nondegree certificate programs, 205–207
- Northeastern Alumni Magazine*, 217
- Northeastern University
 - history, 4–5
 - location and campus, 6–8
 - transportation and visitor information, 7–8
- nuArts* Performance Series, 92
- NUPRIME (Northeastern University Progress in Minorities in Engineering), 142
- Nursing, College of, 13, 168–172
 - accreditation and licensure, 171
 - faculty, 168
 - fees, 33
 - freshman-year courses, 172
 - graduate programs, 207
 - research activities, 210
- Nursing Resource Unit, 170–171
- Nursing Student Loan, 39
- Open Campus Plan**, 17
- Open Option Program, 186–187
- Organizations, student, 229–230
- Orientation, 17, 224
 - Student Orientation Staff, 45
 - transfer students, 23
- Overseas study programs, 86–88
- Oxford, study at, 86
- Paralegal Program**, 204
- Parent Loan Program (PLUS), 39
- Parking, 46

Parsons Field, 231
 Part-time programs, 201–204
 Division of Continuing Education, 203–204
 Engineering and Engineering Technology, 142, 161, 202–203
 Pass/fail system, 48
 Peabody Health Professions Center, 174
 Pell Grants, 38
 Performing and Visual Arts Division, 56–59, 92–93
 Art and Architecture, 56–57
 Music, 57–58
 student organizations, 229
 Theatre and Dance, 58–59
 Perfusion Technology Certificate Program, 178
 Perkins Student Loan, 39
 Personal Computing Initiative, 221
 Personal Financial Planning specialization, 121
 Pharmaceutical Sciences, Department of, 182
 Pharmacy and Allied Health Professions, College of, 13, 173–174
 accreditation, 174
 administrative faculty, 173
 fees, 33
 graduate programs, 207
 licensure, 183
 Open Option Program, 186–187
 research activities, 210–211
 Pharmacy and Allied Health programs, 175–189
 Dental Hygiene, 187–189
 Health-Care Curriculum Open Option, 186–187
 Health Information Administration, 175–176
 Medical Laboratory Science, 179–181
 Perfusion Technology Certificate, 178
 Pharmacy, 182–184
 Respiratory Therapy, 177
 Toxicology, 184–186
 Pharmacy Practice, Department of, 182

Philosophy and Religion, Department of, 62–63
 Physical Education Center, 7, 99, 231
 Physical Education Teacher Preparation Program, 105–106. *See also* Health, Sport, and Leisure Studies, Department of
 electives, 108
 Physical Therapy, Department of, 109–111
 licensure, 100
 Physical Therapy Club, 110
 Physics, Department of, 71–73
 Political Science, Department of, 81–82
 Power Systems Engineering option, 150
 Preprofessional advising, 224
 Professional Accounting, Graduate School of, 207
 Professional schools. *See* Graduate and Professional Schools
 Professional Schools Program, 91
 Project Ujima, 21
 Psychology, Department of, 82–83
 Public Safety Division, 224

Quality-point average, 48

Radiologic Technology Program, 200
 Reading Clinic, 99, 217, 225
 Real Estate specialization, 121
 Recreational Sports Program, 231
 Recreation Management Program, 106–107
 Religion. *See* Philosophy and Religion, Department of
 Religious Life Office, 225
 Remedial programs, 198–199
 Research activities, 208–212
 centers and institutes, 211–212
 Research Center, Dana, 7, 73
 Reserve Officers' Training Corps (ROTC), 193–197
 Air Force, 194–195
 Army, 193–194

- fees, 33
- Navy, 195–197
- Veterans, 194
- Residence halls, 42–43
 - activities fee, 32
 - policies and staff, 45
- Residential Life, Department of, 43
- Respiratory Therapy Program, 177
- Robinson Hall, 99, 170–171
- Rolling Admission Plan, 16
- Room-and-board expenses. *See* Housing; Meal plans
- Russian Studies minor, 89
- Ryder Hall, 8
- St. Ann Roman Catholic Parish and Student Center, 225**
- Scholarships and grants, 240–261. *See also* Awards; Financial Aid; Loans
 - Ambassador Awards, 22
 - Bunche Scholars Program, 20
 - community, 16
 - Ell Scholars Program, 19
 - ROTC, 193–195, 197
 - state and federal, 37–39
 - University, 40, 240–259
- Scholastic Aptitude Test, 14
- Scholastic standing reports, 49
- School and Community Health Education Program, 107–109
- Sciences and Mathematics Division, 13, 65–73
 - Biology, 65–67
 - Chemistry, 67–68
 - Geology, 69
 - Mathematics, 70–71
 - Physics, 71–73
- Secondary Education Program, 101
- Security
 - escort service, 46
 - residence halls, 45
- Sign Language Teacher Training Program, 90
- Snell Engineering Center, 7
- Social Sciences Division, 73–86
 - African-American Studies, 74
 - Economics, 75–76
 - History, 76–77
 - Human Services, 77–79
 - Linguistics, 79–80
 - Political Science, 81–82
 - Psychology, 82–83
 - Sociology/Anthropology, 84–86
- Sociology/Anthropology, Department of, 84–86
- Solomon track and field facility, 231
- Sororities, 230
- Spanish, elementary, 91
- Special students, 18
- Speech and Hearing Clinic, 220
- Speech Communication, Department of, 64–65
- Speed reading course, 225
- Sport in Society, Center for the Study of, 218
- Sports, 230–232. *See also* Athletic Training Program; Health, Sport, and Leisure Studies, Department of
 - Club Sports Program, 231
 - facilities, 7, 46, 231
 - intramural program, 230
 - recreational program, 231
 - varsity, 231–232
- Stafford Loan Program, 38
- State assistance programs, 37
- State-of-the-Art Program, 204
- Strategic Management of Technology, Center for the, 212
- Student Affairs, Office of, 171
- Student organizations, 229–230
 - activities fee, 32
- Student Orientation Staff, 45
- Studies in American Fiction, 94*
- Study skills and competency development, 17–18. *See also* Tutoring
 - Academic Assistance Center, 217
 - Alternative Freshman-Year Program, 16–17, 190–192
 - Basic College Compensatory Programs, 198–199

Project Ujima, 21
 Supplemental Educational Opportunity Grant, 38
 Supplemental Loans Program, 39
 Swimming. *See* Barletta Natatorium

Teacher certification, 93, 100, 102, 106
 early childhood and elementary education, 101
 school and community health education, 108
 secondary school mathematics, 71
 Teacher preparation, 93
 ASL, 90
 early childhood and elementary education, 101–102
 physical education, 105–106
 Technical Communication minor, 89
 Technical writing, nondegree program in, 205
 Test of English as a Foreign Language (TOEFL), 14, 18, 23
 Test Preparation Program, 204
 Theater and Dance, Department of, 58–59
The Scriblerian, 94
 Three-Year Co-op Program, 179
 Tours, campus, 11
 Toxicology Program, 184
 Traffic Service, Office of, 46
 Transcripts, 49
 Transfer credit, 54
 College of Engineering, 142
 College of Nursing, 170
 Transfer students
 admissions, 22–23
 Advanced Placement, 22
 Aerospace Co-op Program, 161
 College of Nursing, 170
 College of Pharmacy and Allied Health Professions, 174
 financial aid, 36–37
 Physical Therapy Program, 99, 110
 ROTC, 194
 Transportation, 7

bicycles, 46
 cars, 46
 Tuition, 30–34
 deferred and late payment, 32
 deposits and refunds, 23, 34, 43
 overloads, 33
 Tutoring. *See also* Advising; Counseling;
 Study skills and competency development
 Academic Assistance Center, 217
 English Language Center, 18, 221–222
 Math Center, 55
 Reading Clinic, 99, 217, 225
 Writing Center, 55

Ujima program, 21
 University College, 201–202
University College Bulletin, 202
 University Degree Completion Program, 218
 Urban Mass Transit Program, 204

Varsity sports, 231–232
 Visitor Information Center, 8
 Visual and Media Design concentration, 57
 Visual Arts. *See* Performing and Visual Arts Division
 Visually-impaired student services, 220

Warren Center, 99
 fee, 33
 Wheelchair/mobility-impaired student services, 220
 Women in Engineering program, 142–143
 Women's Studies Program, 90
 Writing
 English Composition achievement test, 14
 Freshman English requirement, 54
 Middler-Year Writing Requirement, 49
 nondegree program, 205
 Writing Center, 55

[illegible]

278

Academic and Service Buildings

| | | | |
|----|--|----|--|
| 22 | African-American Institute (AF) | 54 | Huntington Plaza |
| 12 | Barletta Natatorium (BN) | | (271 Huntington Avenue) (HN) |
| 19 | Boiler Plant | 10 | Hurtig Hall (HT) |
| 7 | 316 Huntington Ave. | 26 | Kariotis Hall (KA) |
| | (Northeastern at the YMCA) | 41 | Kerr Hall (Faculty Center) (KH) |
| 11 | Cabot Physical Education Building (CB) | 29 | Knowles Center (Gryzmish Hall) (KG) |
| 39 | Cahners Hall (CA) | 29 | Knowles Center (Volpe Hall) (KV) |
| 28 | Cargill Hall (CG) | 25 | Lake Hall (LA) |
| 13 | Churchill Hall (CH) | 60 | Library (LR) |
| 59 | Columbus Place | 57 | Matthews Arena (MA) |
| | (716 Columbus Avenue) (CP) | 58 | Matthews Arena Annex (MX) |
| 56 | Cotting School (CT) | 20 | Meserve Hall (ME) |
| 9 | Cullinane Hall (CN) | 5 | Mugar Life Science Building |
| 40 | Cushing Hall (CU) | | (Peabody Health Professions Center) (MU) |
| 14 | Dana Research Center (DA) | 18 | Nightingale Hall (NI) |
| 27 | Dockser Hall (DK) | 31 | Parker Building (PA) |
| 6 | Dodge Building (DB) | 5 | Peabody Center |
| 3 | Ell Student Building (Auditorium) (EL) | 2 | Richards Hall (RI) |
| 4 | Ell Student Center (Student Lounge) (EC) | 8 | Robinson Hall (RB) |
| 16 | Forsyth Building (FR) | 21 | Ryder Hall (RY) |
| 17 | Forsyth Building Annex (FA) | 15 | Snell Engineering Center (SN) |
| 38 | Forsyth Dental Building (FE) | 50 | 122 St. Stephen Street (SS) |
| 1 | Hayden Hall (HA) | 30 | Stearns Center (ST) |
| 33 | Hillel-Frager (HF) | 32 | 26 Tavern Road (TA) |
| 24 | Holmes Hall (HO) | | |
| 55 | 236 Huntington Avenue (HU) | | |

Residence Buildings

| | | | |
|----|--------------------------|----|---------------------------------|
| 34 | Burstein Hall | 35 | Rubenstein Hall |
| 51 | 337 Huntington Ave. | 44 | Smith Hall |
| 43 | Kennedy Hall | 49 | Speare Hall |
| 46 | 142-148 Hemenway Street | 48 | Stetson East |
| 45 | 153/157-163 Hemenway St. | 47 | Stetson West |
| 36 | 407 Huntington Ave. | 50 | 106/110/116/122 St. Stephen St. |
| 52 | 319 Huntington Ave. | 23 | Willis Hall |
| 41 | Kerr Hall | 37 | White Hall |
| 53 | Light Hall | 7 | 316 Huntington Ave. |
| 42 | Melvin Hall | | (Northeastern at the YMCA) |
| | | 61 | 400 The Fenway |

Northeastern University's Mission

Northeastern University's mission, as a large urban university founded on the cooperative model of education, is to provide individuals with the opportunity for upward mobility through excellence in education. The University achieves its mission through curricula that value equally knowledge for its own sake, knowledge as a means to success in the workplace, and knowledge as a cornerstone of personal achievement and satisfaction.

Achieving Northeastern University's mission requires excellence in teaching, and teaching remains the central activity of Northeastern's faculty. By offering undergraduate and graduate programs that are rigorous, relevant, and rewarding, the University provides a solid structure for educational excellence. Northeastern University is also committed to the search for knowledge through the scholarly and artistic undertakings of its faculty and students.

A central mandate of Northeastern University is to offer students the opportunity to apply directly lessons of the classroom and laboratory to the workplace through cooperative education. For three quarters of a century, cooperative education has been the keystone of Northeastern's uniqueness. As an increasing percentage of the nation's population enters the work force and new technologies continue to change the nature of work, the University has rededicated itself to helping the cooperative plan keep pace with those changes.

Northeastern University is committed to serving the educational needs of a diverse student population in an amenable physical environment. The University believes that its mission can be achieved only if the student body is not limited by economic status, cultural or racial background, geographic origin, sex, or age. Northeastern has a long history of serving the educational needs of the nontraditional student, providing degree and nondegree programs for people whose circumstances prevent them from following the standard college regimen.

Looking beyond the confines of the campus, Northeastern University is determined to maintain and strengthen its reputation as a friend to the City of Boston and a partner of the Commonwealth of Massachusetts. The University's obligation to serve the community of which it is an integral part is fulfilled primarily through the educational enterprise. Through its numerous outreach programs, the University has made striking contributions to the community in the applied social sciences, in high technology, and in the arts. Northeastern University will continue to contribute in these and other ways to the region's overall quality of life and to its economic vitality.

Accreditation Statement

Northeastern University is accredited by the New England Association of Schools and Colleges, Inc., a nongovernmental, nationally recognized organization whose affiliated institutions include elementary schools through collegiate institutions offering postgraduate instruction.

Accreditation of an institution by the New England Association indicates that it meets or exceeds criteria for the assessment of institutional quality periodically applied through a peer group review process. An accredited school or college is one which has available the necessary resources to achieve its stated purposes through appropriate educational programs, is substantially doing so, and gives reasonable evidence that it will continue to do so in the foreseeable future. Institutional integrity is also addressed through accreditation.

Accreditation by the New England Association is not partial but applies to the institution as a whole. As such, it is not a guarantee of the quality of every course or program offered, or the competence of individual graduates. Rather, it provides reasonable assurance about the quality of opportunities available to students who attend the institution.

Inquiries regarding the status of an institution's accreditation by the New England Association should be directed to the administrative staff of the school or college. Individuals may also contact the New England Association of Schools and Colleges, The Sanborn House, 15 High Street, Winchester, Massachusetts 01890, 617-729-6762.

Delivery of Services

The University assumes no liability, and hereby expressly negates the same, for failure to provide or delay in providing educational or related services or facilities or for any other failure or delay in performance arising out of or due to causes beyond the reasonable control of the University, which causes include, without limitation, power failure, fire, strikes by University employees or others, damage by the elements and acts of public authorities. The University will, however, exert reasonable efforts, when in its judgment it is appropriate to do so, to provide comparable or substantially equivalent services, facilities or performance, but its inability or failure to do so shall not subject it to liability.

The Northeastern University *Bulletin* contains current information regarding the University calendar, admissions, degree requirements, fees, and regulations, and such information is not intended to be and should not be relied upon as a statement of the University's contractual undertakings.

Northeastern University reserves the right in its sole judgment to promulgate and change rules and regulations and to make changes of any nature in its program, calendar, admissions policies, procedures and standards, degree requirements, fees, and academic schedule whenever it is deemed necessary or desirable, including, without limitation, changes in course content, the rescheduling

of classes, canceling of scheduled classes and other academic activities and requiring or affording alternatives for scheduled classes or other academic activities, in any such case giving such notice as is reasonably practicable under the circumstances.

Northeastern University will do its best to make available to you the finest education, the most stimulating atmosphere, and the most congenial conditions it can provide. But the quality and the rate of progress of your academic career is in large measure dependent upon your own abilities, commitment, and effort. This is equally true with respect to professional advancement upon completion of the degree or program in which you are enrolled. The University cannot guarantee that you will obtain or succeed at any particular job; that will depend upon your own skills, achievement, presentation, and other factors such as market conditions at that time. Similarly, in many professions and occupations there are increasing requirements imposed by federal and state statutes and regulatory agencies for certification or entry into a particular field. These may change during the period of time when you are at Northeastern and they may vary from state to state and from country to country. While the University stands ready to help you find out about these requirements and changes, it is your responsibility to initiate the inquiry because the University has no other way of knowing what your expectations and understandings are.

In brief, the University is there to offer you educational opportunities and choices and to assist you in finding the direction in which you want to steer your educational experience. But you are a partner in this venture with an obligation and responsibility to yourself.

Tuition and Regulations

Tuition rates, all fees, rules and regulations, courses, and course content are subject to revision by the President and the Board of Trustees at any time.

Disability Resource Center

The Disability Resource Center provides a variety of support services and general assistance to all of Northeastern's disabled students and employees.

Northeastern's efforts to comply with the Title IX Education Amendments of 1972 and Section 504 of The Rehabilitation Act of 1973 are coordinated by the Dean and Director of Affirmative Action.

Equal Opportunity Policy

Northeastern University does not discriminate on the basis of race, color, religion, sex, sexual preference, age, national origin, or veteran or handicapped status in admission to, access to, treatment in, or employment in its programs and activities. In addition, Northeastern University will not condone any form of sexual harassment. Handbooks containing the University's nondiscrimination policies and its grievance procedures are available in the Office of Affirmative Action, 175 Richards Hall. Inquiries regarding the University's nondiscrimination policies may be directed to Ellen S. Jackson, Dean/Director, Office of Affirmative Action, 175 Richards Hall, Northeastern University, Boston, Massachusetts 02115, 617-437-2133.

Inquiries concerning the application of nondiscrimination policies may also be referred to the Regional Director, Office for Civil Rights, United States Department of Education, J. W. McCormack Building, Post Office Court House, Room 222, Boston, Massachusetts 02109-4557.

Family Educational Rights and Privacy Act

In accordance with the Family Educational Rights and Privacy Act of 1974, Northeastern University permits its students to inspect their records wherever appropriate and to challenge specific parts of them when they feel it necessary to do so. Specific details of the law as it applies to Northeastern are printed in the *Student Handbook* and are distributed annually at registrations of University College and the graduate schools.

Emergency Closing of the University

Northeastern University has made arrangements to notify students, faculty, and staff by radio when it becomes necessary to cancel classes because of extremely inclement weather. AM radio stations WBZ (1030), WEEI (590), WHDH (850), WRKO (680), and FM stations WBCN (104.1), and WROR (98.5) are authorized to announce the University's decision to close. Since instructional television courses originate from live or broadcast facilities at the University, neither the classes nor the courier service operates when the University is closed.

For more information, please write or telephone:
Department of Undergraduate Admissions
Northeastern University
360 Huntington Avenue
Boston, MA 02115
617-437-2200

Credits

| | |
|------------------|-------------------------|
| Project Director | <i>Pamela R. Geddis</i> |
| Graphic Designer | <i>Janet O'Donoghue</i> |
| Managing Editor | <i>Camilla Ayers</i> |
| Photographer | <i>Frank Siteman</i> |

Department of Undergraduate Admissions
300 Huntington Avenue
Boston, MA 02115

Fall at Boston, MA
and additional
Meeting Offices

GENE A DAMON
LIBRARY
211 DODGE LIBRARY

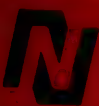
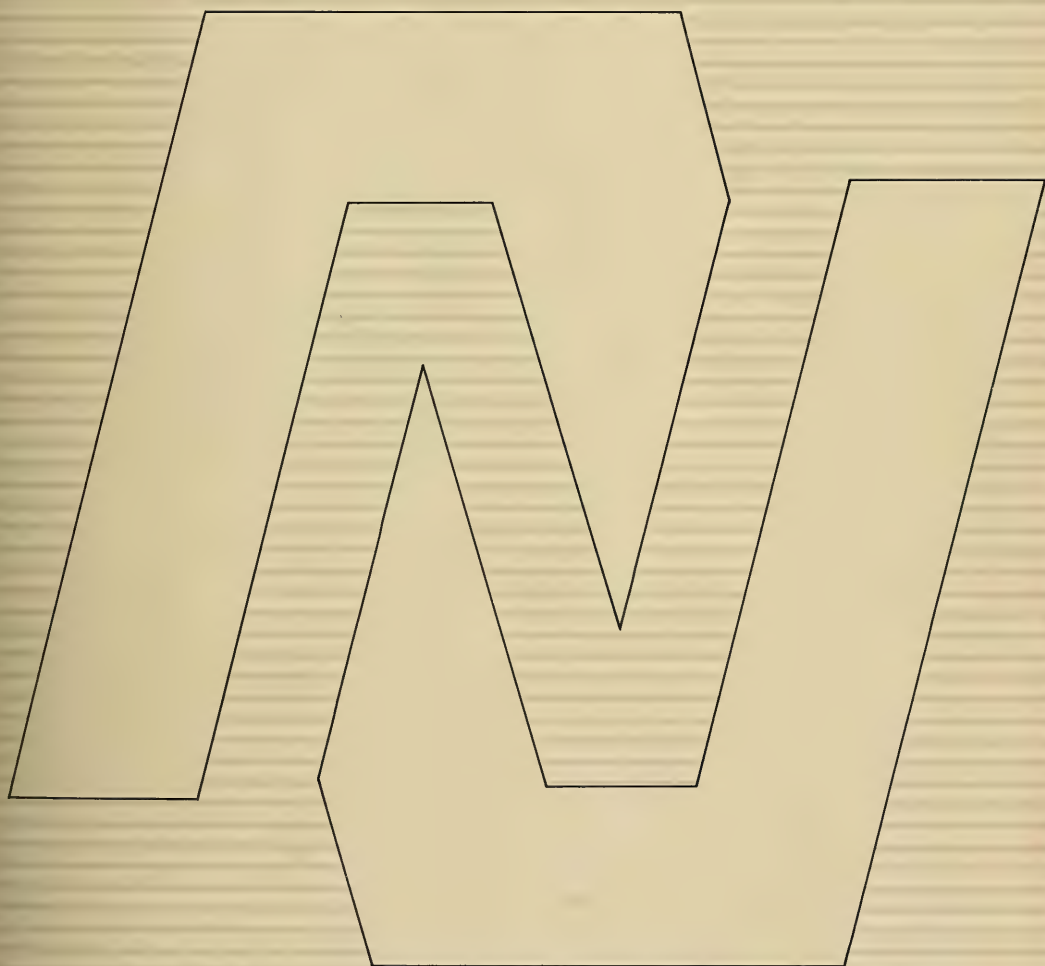


1 9 9 0 - 1 9 9 1

UNIVERSITY COLLEGE

BULLETIN

PART-TIME UNDERGRADUATE PROGRAMS



Northeastern University

Contents

| | | |
|----------------------------|---|-----|
| Introduction | 1990-1991 Academic Calendar | 2 |
| | About University College | 4 |
| | University College Offices | 10 |
| | Policies and Procedures | 12 |
| Programs of Study | Overview | 32 |
| | Certificate Programs | 35 |
| | Business Administration Degree Programs | 60 |
| | Criminal Justice and Security Degree Programs | 85 |
| | Health Professions and Sciences Degree Programs | 91 |
| | Liberal Arts Degree Programs | 110 |
| | Alternative Freshman-Year Program | 127 |
| Course Descriptions | | 130 |
| General Information | Tuition and Fees | 248 |
| | Financial Aid | 250 |
| | Scholarships | 253 |
| Appendix | Facilities and Resources | 257 |
| | About Programs at Northeastern University | 259 |
| | Faculty | 269 |
| | University College Administrative Officers | 298 |
| | University Governing Boards and Officers | 300 |
| | Campus Maps | 304 |
| | Index | 312 |

1990-1991 Academic Calendar

FALL

Classes Begin:
Monday, September 24, 1990

WINTER

Classes Begin:
Wednesday, January 2, 1991

| | | |
|--|--|---|
| Belmont | Thurs., Sept. 6 and Tues., Sept. 11, 5:30-8 p.m. | Tues., Dec. 4, 5:30-8 p.m. |
| Boston Main Campus | Tues.-Friday, Sept. 4-7, 9:30 a.m.-7 p.m. Sat., Sept. 8, 9 a.m.-12 noon Mon.-Wed., Sept. 10-12, 9:30 a.m.-7 p.m. | Mon.-Thurs., Dec. 3-6, 9:30 a.m.-7 p.m. |
| Downtown Boston Campus (5 Liberty Square) | Thurs., Sept. 6, 11 a.m.-7 p.m. Mon.-Tues., Sept. 10-11, 11 a.m.-7 p.m. | Mon.-Wed., Dec. 3-5, 11 a.m.-7 p.m. |
| Burlington Suburban Campus | Wed.-Thurs., Sept. 5-6, 5:30-8 p.m. Fri., Sept. 7, 12 noon-3 p.m. and 5:30-8 p.m. Mon.-Tues., Sept. 10-11, 5:30-8 p.m. | Mon.-Wed., Dec. 3-5, 5:30-8 p.m. |
| Chelmsford High School | Thurs., Sept. 6 and Tues., Sept. 11, 5:30-8 p.m. | Tues., Dec. 4, 5:30-8 p.m. |
| Dedham Campus | Thurs., Sept. 6 and Mon., Sept. 10, 5:30-8 p.m. | Mon.-Wed., Dec. 3-5, 5:30-8 p.m. |
| Framingham North High School | Tues., Sept. 4 and Mon., Sept. 10, 5:30-8 p.m. | Mon.-Wed., Dec. 3-5, 5:30-8 p.m. |
| Marlboro High School | Wed., Sept. 5 and Mon., Sept. 10, 5:30-8 p.m. | Mon., Dec. 3, 5:30-8 p.m. |
| Marshfield High School | Thurs., Sept. 6 and Tues., Sept. 11, 5:30-8 p.m. | Tues., Dec. 4, 5:30-8 p.m. |
| Milford High School | Thurs., Sept. 6 and Tues., Sept. 11, 5:30-8 p.m. | Tues., Dec. 4, 5:30-8 p.m. |
| Peabody Veterans Memorial High School | Wed., Sept. 5 and Mon., Sept. 10, 5:30-8 p.m. | Mon., Dec. 3, 5:30-8 p.m. |
| Stoneham High School | Thurs., Sept. 6 and Tues., Sept. 11, 5:30-8 p.m. | Tues., Dec. 4, 5:30-8 p.m. |
| Westwood High School | Thurs., Sept. 6 and Tues., Sept. 11, 5:30-8 p.m. | Mon.-Wed., Dec. 3-5, 5:30-8 p.m. |
| Weymouth North High School | Wed., Sept. 5, and Mon., Sept. 10, 5:30-8 p.m. | Mon.-Wed., Dec. 3-5, 5:30-8 p.m. |
| Winchester High School | Wed., Sept. 5 and Mon., Sept. 10, 5:30-8 p.m. | Mon., Dec. 3, 5:30-8 p.m. |

SPRING

Classes Begin:
Monday, April 1, 1991

SUMMER

Classes Begin:
Monday, June 17, 1991

| |
|---|
| Tues., Mar. 12, 5:30-8 p.m. |
| Mon.-Thurs., Mar. 11-14, 9:30 a.m.-7 p.m. |
| Mon.-Wed., Mar. 11-13, 11 a.m.-7 p.m. |
| Mon.-Wed., Mar. 11-13, 5:30-8 p.m. |
| Tues., Mar. 12, 5:30-8 p.m. |
| Mon.-Wed., Mar. 11-13, 5:30-8 p.m. |
| Mon.-Wed., March 11-13, 5:30-8 p.m. |
| Mon., Mar. 11, 5:30-8 p.m. |
| Tues., Mar. 12, 5:30-8 p.m. |
| Tues., Mar. 12, 5:30-8 p.m. |
| Mon., Mar. 11, 5:30-8 p.m. |
| Tues., Mar. 12, 5:30-8 p.m. |
| Mon.-Wed., Mar. 11-13, 5:30-8 p.m. |
| Mon.-Wed., Mar. 11-13, 5:30-8 p.m. |
| Mon., Mar. 11, 5:30-8 p.m. |

| |
|--|
| First Five Weeks: Mon.-Thurs., June 3-6, 9:30 a.m.-7 p.m. Second Five Weeks: Mon., July 8 and Tues., July 9, 9:30 a.m.-7 p.m. |
| First Five Weeks: Mon.-Wed., June 3-5, 5:30-8 p.m. Second Five Weeks: Mon., July 8, 5:30-8 p.m. |

Calendar changes may be made. The University community will be notified if such changes occur.

Holidays and Observances

| | |
|----------------------------|---|
| Fall Quarter: | Columbus Day - Mon., Oct. 8 Veterans' Day - Mon., Nov. 12 Thanksgiving Recess - Thurs.-Sat., Nov. 22-24 Christmas Vacation - Mon., Dec. 17 - Tues., Jan. 1 |
| Winter Quarter: | Martin Luther King Jr.'s Birthday - Mon., Jan. 21 President's Day - Mon., Feb. 18 Spring Recess - Mon., Mar. 25-Sun., Mar. 31 |
| Spring Quarter: | Patriots' Day - Mon., Apr. 15 Memorial Day - Mon., May 27 Commencement - Sat., June 15 |
| Summer Quarter: | |
| First Five Weeks: | Independence Day - Thurs., July 4 |
| Second Five Weeks: | Labor Day - Mon., Sept. 2 |
| Final Exam Periods: | F - Mon.-Sun., Dec. 10-16 W - Mon.-Sun., Mar. 18-24 Sp - Mon.-Sun., June 10-16 S - Final exam period for summer quarter held during last class session of each term. |

About University College

A Letter from the Dean

I would like to take this opportunity to welcome you to University College. We are the part-time undergraduate division of Northeastern University, which has long been a leader in educational programs for adults. We're called University College because we tap the energies and resources of the entire University. Unlike other institutions offering similar programs, Northeastern opens all its doors, giving you unequalled access to the academic facilities you need. At University College, we constantly evaluate and update our programs to satisfy your changing professional, cultural, and social needs and interests.

With your plans and ideas to guide you, you can set your sights on any

direction at University College. Whether you already have a definite plan or want to investigate new possibilities, our programs and resources are designed to help you get to where you want to be. At University College, we attract a talented and purposeful student body that represents a spectrum of educational, career, and personal interests. The entire Northeastern University community benefits from the diversity of direction pursued by you, our part-time day and evening students.

As you read through this Bulletin to explore the possibilities, you'll find our ever-present encouragement and support.

*John W. Jordan
Dean, University College*

Offering What You Want: Our Programs

Naturally, Northeastern University offers all the traditional academic programs you expect from a large university, including timely and innovative programs in business administration, criminal justice and security, health professions and sciences, and liberal arts. Among these programs are five bachelor's degree concentrations in business that carry the extra prestige of full accreditation by the American Assembly of Collegiate Schools of Business.

Many students come to Northeastern University to take specific, job-related

courses. To serve these students, we have developed more than forty certificate programs. In most cases, these programs incorporate or build on the major concentration courses required in each of our professionally focused undergraduate degree programs.

Northeastern also offers practical, part-time associate degree programs for students who are seeking a first-rate, first-level college degree, as well as bachelor's degrees in all four areas: Business Administration, Criminal Justice and Security, Health Professions and Sciences, and Liberal Arts.

Getting the Attention You Need: Class Size

Everyone knows Northeastern is big. What many people don't realize is that because we operate at sixteen different locations, our classes tend to be small. And many of our specialized degree and certificate programs enroll only small numbers of students because of

their unique focus. Last year, our average class size was fifteen students. Many classes ran with fewer students, and only 10 percent of all classes offered ran with enrollments larger than twenty-seven.

**Making Our
Programs
Work For
You:
Convenience**

We know you're busy, and finding the time to continue your education can be a real challenge. To help you out, Northeastern not only schedules classes at sixteen different locations in eastern Massachusetts, but also provides different course formats. While most courses are offered on a twelve week schedule, some courses are offered in a six week format to accommodate the complex lives of many

adults. Also, for those of you who would like to accelerate the educational process, University College offers numerous intensive courses which are generally equivalent to two regular courses. These intensives can be found on our schedules almost every night, but look for them on Friday night and Saturday morning when they are available at a reduced tuition rate.

**Offering
Knowledge
and
Experience:
The Faculty**

A course is only as good as its teacher. That's why University College carefully selects both full-time Northeastern University faculty and practicing professionals for its teaching staff of 1,650. Corporate executive officers, published authors, established health professionals, artists, graphic designers, computer experts, lawyers, professors,

and others offer students the benefit of their experience and current information about how careers in their fields are changing. Many have found teaching adults particularly rewarding and have expressed their pleasure at having such committed, hard-working, and enthusiastic students.

**Meeting Your
Colleagues:
The Students**

Approximately 15,000 adults come to University College every year to pursue a degree, update their careers with a certificate, or take a course in a subject that has long interested them. These adult students range in age from 18 to 80 and come from all walks of life: women re-entering the work force, young men and women seeking to start new careers, older people polishing their skills, people of every

age intent on finishing an education that time or circumstances interrupted. All have one thing in common—they are making a change in their lives through their own actions, expanding their world by investing in themselves. This diversity is a source of stimulation and enrichment for all—students, faculty, and administration alike.

**We're Here
to Help:
Counseling
Services**

University College offers a wide range of career and academic counseling services to assist you in making both educational and career decisions. The College provides academic advisors

and career counselors, offers credit and noncredit career-planning workshops and special programs, and serves as a link to other student support services offered by Northeastern University.

**Open House
and
Registration
Week
Orientation
Programs**

Individuals who are thinking about enrolling in University College for the first time are encouraged to attend an Open House. Open Houses introduce potential students to the many University College programs and services designed to meet the educational, job-related, and personal needs of adult, part-time students. They also orient new students to the University as a whole and address concerns that many students have about

- admission to degree programs, and
- certificate programs.

Students currently enrolled in University College are also invited to attend an Open House.

Open Houses are ordinarily scheduled each quarter at selected campus sites at or about the same time that registration takes place. Details appear in the *Schedule Guide* for each term.

- transfer credit,
- international student applications,

Academic Advising

Academic advisors are available by appointment to talk with University College students about courses, transfer credit, degree requirements, career counseling referrals, and other matters of individual concern.

To make an appointment at a specific campus, please call the appropriate number, as listed below.

- *Main Boston Campus:* Advisors are available weekdays from 8:30 a.m. to 7 p.m. Call 617-437-2400 (voice), or 617-437-2825 (TTY, for the hearing impaired only).
- *Burlington Suburban Campus:* Call 617-272-5500.
- *Downtown Boston Campus* (5 Liberty Square): Call 617-367-6373.
- *All other branch locations:* Advisors are available from 5:30 to 7 p.m. on the evenings when classes are in session. Call 617-437-5544 for an appointment.

Tutorial Services

University College offers tutorial assistance in several subjects. Tutoring, which is on a one-to-one basis, provides an opportunity for student and tutor to focus on specific problems that might not have been covered during

During registration, the advising staff in Boston is available to meet with students on a walk-in basis from 9 a.m. to 7 p.m. Students may also call in with questions during these times. In addition, registration advisors are available at all campuses during registration hours to assist students with course selection and to explain registration procedures.

The Health Professions Advisory Committee provides counseling for students interested in taking courses to meet medical or dental school entrance requirements. For medical school entrance requirements and procedures, contact Professor Thomas McEaney 617-437-2430. For information on the scheduling of science courses that meet these requirements, call 617-437-2818.

Career Development Course

Often one of the strongest motivations for continuing education is the desire for career advancement or change. In order to help students develop career and educational planning skills, University College offers a three-quarter-hour course in career develop-

class time. You may request tutorial information from the Office of Academic and Student Affairs, 617-437-2400. A flyer describing tutorial services is also available at all campus locations.

ment (INT 4110). Formerly titled Self-Assessment and Career Development, the course has been renamed **Managing Career Decisions**. For more information, see the course description on page 190 of this *Bulletin*.

Career Development and Placement Services

The primary purpose of the Department of Career Development and Placement is to assist all students, alumni and members of the Northeastern University community in developing and implementing successful career plans.

For additional information contact:
Northeastern University
Department of Career Development
and Placement
120 Ryder Hall
Boston, MA 02115
617-437-2428

Office Hours:

Sept.-June: 8:30-4:30, Monday-Friday

In addition, the Career Resource Center is open until 8:00 p.m., Tuesday and Wednesday, for counseling appointments and general use of print resources.

Summer Quarter: 8:30-5:30,
Monday-Thursday.

| | | |
|--|--|--|
| Career Counseling | <p>Career counseling is available to help students make sound career decisions. Depending on individual needs, career counseling might include: planning a career or a career change, making decisions, developing effective job search strategies or participating in</p> | <p>videotaped mock interviews. Students decide with the counselor whether they need one or more sessions. Career counseling is by appointment in Boston, Burlington, and Dedham by calling 617-437-2428.</p> |
| Job Search Seminars | <p>During day and evening hours, seminars are offered on self assessment, resume and cover letters, interviews, job search strategies, first impressions, and choosing a major. Presentations take place on the main Boston campus as well as satellite campuses. Sessions are offered at the Boston campus for students interested in international information. Topics include overviews of global employment resources for foreign nationals and</p> | <p>American citizens and international study and internship options. Preregistration for all seminars is required.</p> <p>Seminar schedules are announced in the student newsletter, <i>Perspectives</i>, and in classes prior to the start of each series. Students who wish to participate in the job-search seminars must reserve a place by calling the Department of Career Development and Placement at 617-437-2428.</p> |
| Career Resource Center | <p>The Career Resource Center provides a variety of services and resources:</p> <ul style="list-style-type: none"> • A main book collection containing occupational information, resume and interviewing resources, job search guides and directories of employers and graduate schools. • A Job Bank containing current local, national, and international job opportunities and internships. • Employer files containing annual | <p>reports, product information and descriptions of entry-level position and training programs.</p> <ul style="list-style-type: none"> • The Guidance Information System, a computerized resource providing information on occupations, colleges, graduate schools and sources of financial aid. • Daily walk-in hours for assistance with resumes, correspondence, interviewing or job search strategies. |
| Career Expos | <p>The department sponsors three Career Expos a year. The Boston Campus hosts the fall and winter Expos and the Burlington Campus hosts the spring Expo. Approximately 70 employers from business, industry,</p> | <p>government and nonprofit agencies attend each of these events. Students and alumni have the opportunity to meet informally with prospective employers to discuss career options and job opportunities.</p> |
| On-Campus Recruiting | <p>The On-Campus Recruiting program offers all students receiving a degree in the current academic year the opportunity to interview with a variety of representatives from business, industry, government and nonprofit agencies. Over 350 employers conduct interviews on campus during the three</p> | <p>recruiting seasons each year. These visits yield over 2000 interviews per quarter. The larger national and international corporations typically recruit during the fall and winter quarters while smaller, nonprofit organizations usually recruit in the spring.</p> |
| Graduate and Professional School Advising | <p>Students who wish to continue their formal education beyond the baccalaureate level may receive individual counseling regarding educational plans, assistance with the preparation of professional recommen-</p> | <p>dations and critiques of written essays and personal statements. Once completed, confidential files can be forwarded to specified graduate and professional schools.</p> |

**Northeastern
National Career
Network**

The Northeastern National Career Network (NNCN) is a voluntary organization of Northeastern alumni and other professional affiliates who are willing to share information on their career fields. NNCN members offer insight into industry trends, their own career experiences, an overview of their field and information on job opportunities. Whether you are an undergraduate trying to focus in on

your career direction or an alumnus/alumna or graduate student making a career change, NNCN members are an extremely valuable source of information and contacts.

For additional information, a counseling appointment in Boston, Burlington or Dedham, or to sign up for a seminar, contact the Department of Career Development and Placement at 617-437-2428.

**Counseling
and Testing
Services**

Students can receive confidential counseling or testing to address personal, educational, or career concerns. Assistance is available to all students during days and certain weekday

evenings until 8:30 p.m. at the Counseling and Testing Center. For information and appointments, call 617-437-2142 or drop in at 302 Ell Building.

**Personal
Counseling**

People come to the center for help with a variety of personal concerns. Anxiety and depression, adjustment reactions to college life, personal or family relationship concerns, drug and alcohol abuse, and sexual adjustment questions are among the issues that

University College students may want to discuss with a professional therapist. The center is committed to short-term therapy, with a maximum of twelve consecutive counseling sessions. If the center cannot meet your needs, appropriate referrals are provided.

**Academic and
Life Skills
Development
Workshop**

Academic and life skills development workshops are offered each term, generally during the day. The Study Skills Development Workshop, among the most popular of these, helps students become more effective in organizing their time, taking notes,

preparing for exams, and other areas of academic performance. Other workshops include Stress Management, Assertiveness Training, Overcoming Procrastination, Surviving Parental Alcoholism, and Surviving Family Break-up.

**Education-
Vocational
Counseling**

With so many fields to choose from, students sometimes have difficulty selecting a major or a career. You may want help in defining your interests, abilities, and values. At the center, education-vocational counseling usually involves an evaluation of the student's interests, aptitudes, abilities,

values, and personality characteristics. Many kinds of tests, available at the center, may be used in this process. Counseling is done on an individual basis, although small groups may be organized when this approach seems useful.

**Career
Information**

The center maintains a small reference library of vocational resources. In addition, a computer is available to help

students in obtaining career information, as well as to help clarify values, skills, and interests.

**Testing
Materials**

Information and application packets for such standardized tests as the GRE, LSAT, GMAT, MAT, and CLEP exams are available at the center.

CLEP exams are given at the center ten times each year, and the center is also a national testing site for the LSAT, GMAT, MAT, and other exams.

Office of Services for the Handicapped

No student should miss or have diminished any of the opportunities at Northeastern. Any student who has a disability-related need, no matter how small or individual, can receive ready support services from the Office of Services for the Handicapped (OSH). Frequently, students are uncertain about how they may be helped by this office; in these situations, a discussion of possible alternatives is useful. OSH provides a range of support services to eliminate the competitive disadvantages that a disability may create. Services are tailored individually to meet the needs of each student.

Types of assistance available from OSH include providing help during orientation, registration, and preregistration, an information clearinghouse, counseling, arranging for housing, and services for the hearing-impaired, the wheelchair user/mobility-impaired, and learning disabled student.

OSH is also the gathering place for the Disabled Student Organization of Northeastern University, which works cooperatively with OSH to plan programs and improve accessibility of services for handicapped people at Northeastern.

University College Offices

General Information

617-437-2400

617-437-2825 (TTY)

Office of the Registrar

120 Hayden Hall

617-437-2300

Monday-Thursday,

8:30 a.m.-7:30 p.m.

Friday, 8:30 a.m.-4:30 p.m.

Belmont High School

221 Concord Avenue

617-484-4418

Tuesday and Thursday,

5:30-10 p.m.

Boston Main Campus

180 Ryder Hall

360 Huntington Avenue

617-437-2400

TTY: 617-437-2825

(for the hearing-impaired only)

Monday-Friday,

8:30 a.m.-8:30 p.m.

Saturday, 8:30 a.m.-1 p.m.

Downtown Boston Campus

5 Liberty Square

617-367-6373

Monday-Thursday,

7 a.m.-10 p.m.

Friday,

8:30 a.m.-4:30 p.m.*

Burlington Suburban Campus

South Bedford Road

617-272-5500

Monday-Friday, 8 a.m.-10 p.m.

Saturday, 8 a.m.-12 noon

Burlington High School

123 Cambridge Street

617-273-1870

Monday-Thursday,

5:30-10 p.m.

Chelmsford High School

200 Richardson Road

508-251-8792

Tuesday and Thursday,

5:30-10 p.m.

Dedham Campus

Common Street

617-329-8000

Monday-Thursday,

8 a.m.-10 p.m.

Friday, 8:30 a.m.-4:30 p.m.

Saturday, 8 a.m.-1:00 p.m.

Framingham North High School

A Street

508-877-2333

Monday-Thursday, 5:30-10 p.m.

Marlboro High School

Bolton Street

508-485-4122

Monday and Wednesday, 5:30-10 p.m.

Marshfield High School

Forest Street

617-837-1835

Tuesday and Thursday, 5:30-10 p.m.

Milford High School

31 West Fountain Street

508-473-2565

Tuesday and Thursday, 5:30-10 p.m.

Peabody Veterans Memorial High School

485 Lowell Street

508-535-1226

Monday and Wednesday, 5:30-10 p.m.

Stoneham High School

149 Franklin Street

617-438-6407

Tuesday and Thursday, 5:30-10 p.m.

Westwood High School

200 Nahatan Street

617-329-3030

Monday-Thursday, 5:30-10 p.m.

Weymouth North High School

1051 Commercial Street

617-335-9112

Monday-Thursday, 5:30-10 p.m.

Winchester High School

80 Skillings Road

617-756-1206

Monday and Wednesday,

5:30-10 p.m.

Summer Office Hours

Office of the Registrar

120 Hayden Hall
Monday-Thursday,
8:30 a.m.–7:30 p.m.

Boston Main Campus

180 Ryder Hall
Monday-Thursday,
8 a.m.–8:30 p.m.

Downtown Boston Campus

5 Liberty Square
Monday-Thursday,
7:30 a.m.–10 p.m.*

Burlington Suburban Campus

Monday-Thursday,
8 a.m.–10 p.m.

Dedham Campus

Monday-Thursday,
8:30 a.m.–10 p.m.
Friday,
8 a.m.–4:30 p.m.

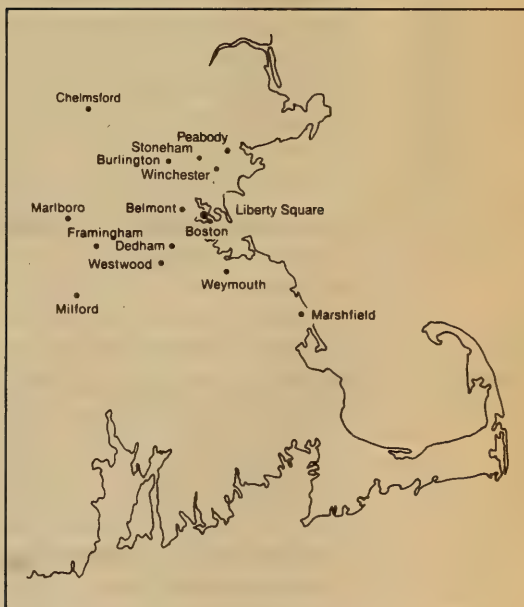
Framingham North High School

Monday and Wednesday,
5:30-10 p.m.

Weymouth North High School

Tuesday and Thursday,
5:30-10 p.m.

*Office hours may vary due to changes in
class schedules.



Policies and Procedures

Open Enrollment

University College has an open enrollment policy that enables students to take most courses simply by registering for the course. Applications for admission, entrance examinations, and College Board Examination scores are not required. The open enrollment policy applies to both degree and nondegree students at University College. Credits earned for individual courses taken at University College may be applied to a degree program.

Students who are enrolled at University College and who decide to pursue a degree program must apply for admission to the program. See page 18 for more information on the admissions process. Special requirements apply to students entering degree programs

such as the Bachelor of Science in Business Administration degree and Bachelor of Science in Nursing program. For information on the admissions process for these programs, please see pages 65-66 and 103 respectively. Students must be admitted to a degree program in order to be eligible for most financial aid. See page 250 for more information on obtaining financial aid. All international students must be admitted to a degree program in order to apply for an I-20 form. See page 14 for more information on international students.

Both degree and nondegree students are entitled to make use of the student support services offered by University College.

Registration

Students may register for courses by mailing in the registration form during the mail-in registration period or reporting to any University College campus during the registration periods that are scheduled each quarter. It is not necessary to register at the campus where a particular course actually meets; students may register at any campus for a course scheduled at any other campus. Attendance at class, even with the instructor's permission, does not constitute registration unless the student has filled out a registration form. Academic credit will not be awarded to students who are not

properly registered. See the Academic Calendar on pages 2-3 for a complete registration schedule.

Courses listed in this *Bulletin* are not necessarily offered each quarter. *Students may not be able to take all of the courses required for a particular program at any one campus location.* Each fall, winter, spring, and summer quarter the list of courses being offered is printed in a University College *Schedule Guide*. *Schedule Guides* are distributed at all campus locations and are mailed to all active students each term. To request a schedule by mail, call 617-437-2400.

Course Selection

Academic advisors (see page 6) are available by appointment at all campuses, to help students plan their academic programs and select courses.

Students who have earned credits from other schools are urged to have their transcripts evaluated prior to the registration period to avoid duplicating course work completed elsewhere. Students should allow at least three weeks from the time all transcripts

have been received for processing transfer credit petitions. During the official registration periods at all campuses, advisors are available without an appointment to answer general questions and to help students make initial course selections. Because the process of evaluating transfer credit is complex, students should not expect advisors to evaluate their petitions during advising appointments.

| | | |
|--|---|---|
| Attendance | University College expects students to meet attendance requirements in all courses to qualify for credit. Attendance requirements vary, and it is the student's responsibility to ascertain what each instructor requires. Absence from regularly scheduled classes may seriously affect the student's academic standing. | If a student is consistently absent without having made arrangements with the instructor, the instructor may take this to mean that the student has withdrawn and may issue a final grade of "W." Permission to make up work missed because of absence may be granted by the instructor on presentation of a reasonable excuse. |
| Auditing Policy | Students are permitted to audit courses upon submitting the usual registration forms and on paying the regular tuition fees. There is no reduction in fees for auditing. An auditor may participate in class discussion, complete papers and projects, and take tests and examinations for informal evaluation. However, regardless of the amount or quality of work completed, | academic credit will not be granted at any time for an audited course. The student's decision to audit a course must be communicated in writing to the Registrar's Office prior to the fourth class meeting. Exceptions to this procedure cannot be approved without authorization by the University College Academic Standing Committee. |
| Change of Address or Name | Change of address and/or name should be reported in writing both to the Registrar's Office, 120 Hayden Hall, Northeastern University, 360 | Huntington Avenue, Boston, MA 02115, and to the Office of Academic and Student Affairs, 180 Ryder Hall. |
| Class Changes | University College reserves the right to cancel, divide, or combine classes when necessary. Although this policy ensures that students will almost never be excluded from a class because it is oversubscribed, it also means that a course may occasionally be cancelled because of inadequate enrollment. Cancellations are more likely to occur among upper-level or advanced courses than among introductory courses. | While students may register as late as the first week of class, cancellation decisions are based on pre-registration figures. Students are therefore encouraged to register in advance to increase the likelihood that the courses they want will run. Seniors who are adversely affected by course cancellations should contact an academic advisor or their program office for help in identifying alternatives. |
| Credit Hours: Quarter-Hour Credit | Credit hours are assigned to a course based on the established educational standard of one credit hour for every three hours of student learning time per week over a term. Thus one hour of lecture or discussion plus two hours of individual study outside of class equals one credit. Northeastern University operates on a quarter-hour credit system. A quarter-hour credit is the equivalent of | three quarters of a semester hour. Most University College courses are assigned three quarter hours (abbreviated "q.h.") of credit and meet for two hours and ten minutes each week. Students who would like to take courses at Northeastern and then transfer these credits to another school are urged to receive permission from an advisor at the other school prior to registering. |

Examinations

Tests are scheduled throughout each quarter at the option of the instructor and are regarded as part of the term's course work. A final examination is held at the end of each quarter in each

course unless an announcement is made to the contrary. The procedure for making up final examinations missed due to student absence may be found on page 27.

Homework

The specific work required for each course in University College is determined by the instructor. In general, University College students are expected to spend an average of six to eight hours per week outside of class on assignments for each course.

Students who are absent are responsible for obtaining their homework assignments from their instructors or from other students. Homework assignments are not available from the Office of Academic and Student Affairs.

International Students

Northeastern University is authorized under Federal law to enroll *non-immigrant alien* students. International Student Applications must be filed by all non-immigrant students. Because the process of applying to University College is complex, deadlines for completed applications are well in advance of the start of each term:

| <u>Deadline</u> | <u>for</u> | <u>Term Starting</u> |
|-----------------|------------|----------------------|
| July 13, 1990 | | Sept. 1990 (Fall) |
| Oct. 12, 1990 | | Jan. 1991 (Winter) |
| Jan. 11, 1991 | | April 1991 (Spring) |
| April 12, 1991 | | June 1991 (Summer) |

Students who miss the deadline for a given term will need to defer attendance to the following term. Proficiency in English is a prerequisite to

admission. Also, there is an application fee of \$75.00.

Questions may be directed to the Office of Academic and Student Affairs, 180 Ryder Hall, 617-437-2400 or to the International Student Office, 270 Holmes Hall, 617-437-2310.

International students who are *resident aliens* in the U.S. must file an International Credentials Evaluation Form for admission and/or transfer credit and must provide proof of their resident alien status (green card). There is an evaluation fee of \$45.00. Questions may be directed to the Office of Academic and Student Affairs. (See page 23, Evaluation of International Educational Credentials for further details.)

Maximum Course Load Policy

It is *recommended* that new students and/or students who are working full-time not take more than 12 quarter hours of credit per term. However, students may take up to 18 q.h. per term without special permission. Any student wishing to take more than 18 q.h. in a given term must file a course overload petition with the Office of

Academic and Student Affairs *at least one week prior to the start of the term*. In no case may a student with a quality point average under 2.0 take more than 12 q.h. per term.

Petition for Course Overload forms are available from the Office of Academic and Student Affairs, 180 Ryder Hall, 617-437-2400.

Pass/Fail Courses

Students may register for one *elective* course per quarter on a pass/fail basis and may not take more than five pass/fail courses total at University College. To be eligible for pass/fail status, the student must be in good academic standing (have at least a 2.0 quality-point average) and must also meet all prerequisites for the course.

To be graded on a pass/fail basis, the student must file a Pass/Fail Petition and have it signed by an academic

advisor. Pass/Fail Petitions are available from the Office of Academic and Student Affairs, 180 Ryder Hall, 617-437-2400. Requests to take a course on a pass/fail basis must be made *prior to the fourth class meeting*. Exceptions to this procedure cannot be approved without authorization from the University College Academic Standing Committee. Please see also the section on Pass/Fail Grades, page 27.

Placement Tests

Placement tests are given to students enrolled in *Critical Writing 1* (ENG 4110), *Business Writing and Reports 1* (ENG 4380), and *Technical Writing 1* (TCC 4101) during the first class session. Some students may be requested to register for *Elements of Writing* (ENG 4011), a three-quarter-hour course offering additional help in writing, or *English for International Students* (ENG 4005, ENG 4006, or ENG 4007).

Students registering for *Mathematics*

1 (MTH 4110) must take a placement test on the first night of class. The results will determine whether the student should take *Basic Mathematics 1* and 2 (MTH 4001 and MTH 4002) prior to taking *Mathematics 1*. Students registering for *College Algebra 1* (MTH 4107) must also take a placement test at the first class meeting. Some students may be asked to register for *Technical Mathematics* (MTH 4006) to help improve their math skills.

Prerequisites

Before registering for a course, students should read the course description in this *Bulletin* to determine if they need to have taken a prerequisite course. In order to ensure academic success, students are

strongly advised to adhere to course prerequisites. Students with questions about prerequisites should contact the program office that administers the course.

Special Students

University College students who wish to take Basic College courses may, in certain instances, enroll on a term-by-term basis. These students must obtain prior approval from both the Office of the Dean of the college offering the course and the University College Office of Academic and Student Affairs, 180 Ryder Hall. Students must

collect both signatures on a Special Registration Form and submit the form to the Registrar's Office. Tuition is charged at the Basic College rate.

Basic College students who wish to enroll in University College courses must obtain prior approval from the academic dean of their college.

Withdrawal Policy

Students who wish to withdraw from a course *must* complete a Course Drop Form, available at any campus location. Students who withdraw from a course prior to the end of the seventh week of a term (please refer to the specific deadline in each Schedule Guide) will have no record of the withdrawal on their transcripts.

Students may withdraw from the beginning of the eighth week to the end of the week prior to final examinations but the withdrawal *will* be noted on their transcripts. No withdrawals will be allowed for any reason during the week in which final examinations are given.

Academic Integrity

The Code of Student Conduct states that "any attempt of a student to present as his or her own work that which is not his or her own or aiding and abetting another student in such an attempt" results in a charge of misconduct, which is cause for disciplinary action.

Students must accept the responsibility to be honest and to respect ethical standards in meeting their academic assignments and requirements. Integrity in academic life requires that students demonstrate

intellectual and academic achievement independent of all assistance except that authorized by the instructor. Consequently, *all* work submitted to meet course requirements, whether it take the form of papers, examinations, laboratory reports, computer projects, quizzes, or any other work assigned, is expected to be the student's own work.

In the preparation of all papers and other written work submitted to meet course requirements, students should be careful to distinguish between ideas which are their own and those which

have been derived from other sources. Proper forms of citation must be used, and sources must be indicated. Students who have questions about these procedures should see their instructors before beginning their projects. Presenting another's work as one's own or improper attribution of sources is plagiarism.

Computer programs written to meet course requirements, like papers, are to be the original work of the student submitting them. Copying a program from another student or from any other source is a form of academic dishonesty.

Collaboration in the completion of written assignments is also a form of

academic dishonesty, unless explicitly permitted by the instructor. Students must acknowledge any collaboration/editing and its extent in all submitted work.

Students may not submit the same paper in two or more courses without the prior written permission of the instructors involved.

Students who fail to meet the responsibility of academic integrity as defined here are subject to disciplinary sanctions ranging from a reduction in grade or failure in the assignment or course to dismissal from the University. Complete disciplinary procedures are outlined in the University College *Student Handbook*.

Academic Monitoring

All students are monitored once each academic year, after the end of spring term. Nondegree students, undeclared majors, and unadmitted students whose quality-point averages fall below 2.0 are contacted by the Office of Academic and Student Affairs and are offered all possible assistance. These students may also be subject to academic review, probation, and

dismissal from University College when such action is warranted.

Students who feel they would benefit from academic assistance are encouraged to work closely with an academic advisor. Students may make appointments by calling 617-437-2400 or TTY: 617-437-2825 (for the hearing-impaired only).

Academic Standing Committee

The University College Academic Standing Committee convenes at least once each month, and more often if necessary, to consider student petitions and requests for exceptions to the academic policies and procedures contained in this *Bulletin*. The Committee

has the power to dismiss students who do not meet the academic standards of University College. The Committee also serves as a hearing board for academic grievances, as outlined in the University College *Student Handbook*.

Disciplinary Action

The University College Board of Inquiry has the authority to warn, censure, suspend, expel, or remove from the list of degree candidates any student who, because of disruptive or illegal conduct or poor character, is considered an unsuitable member of the College community. The Board of Inquiry is convened to hear a case when

a member of the University College community charges a student with a violation of the Code of Student Conduct. Complete procedures are contained in the University College *Student Handbook*, which can be obtained at all campus locations or by calling 617-437-2400 (voice) or 617-437-2825 (TTY).

Student Records

In accordance with the Family Educational Rights and Privacy Act of 1974, Northeastern University permits students to inspect their records whenever appropriate and to challenge

specific parts of them when they feel it is necessary. Specific details of the law as it applies to Northeastern are available in the University College *Student Handbook*.

Students' Rights and Responsibilities

The University subscribes to the view that all students have certain rights and freedoms. For these reasons, the University has adopted and published specific policies and procedures governing student rights and freedoms, general conduct, student discipline, grievance procedures, disclosure of information from student records, and University judicial procedures. Judicial procedures are related to issues of discipline and conduct, the

right of students to appeal judgments of their academic performance, grievances based on the fact that a student is handicapped, and allegations of sexual harassment. All policies and procedures governing the above matters may be found in the University College *Student Handbook*. Copies are available in the Office of Academic and Student Affairs or by calling 617-437-2400. In general, copies are also available at each campus location.

Degree Program Policies and Procedures

Applying for Admission to a Degree Program

A student who wishes to be admitted to University College as a degree candidate must follow either Option 1 or Option 2 procedures as outlined here.

Students are urged to apply for admission as soon as they are eligible. Students must be admitted to a degree program in order to be eligible for most financial aid. Non-immigrant interna-

tional students must also be admitted to a degree program and must follow the procedures outlined on page 14, International Students. International students who are resident aliens must follow the procedures outlined on page 23 Evaluation of International Educational Credentials.

Option 1

In general, students who want to apply for admission to a degree program must have

- completed at least eighteen quarter hours of credit, which may include transfer credit, and *must* include English courses ENG 4110, ENG 4111, and ENG 4112 or their equivalents;
- a minimum grade-point average of at least 2.0 (C) at University College (i.e. successfully completed at least one U.C. course); and
- a high school diploma or a high school equivalency certificate (GED).

In addition to the above requirements,

- Students who wish to apply to a Bachelor of Science in Business

Administration (BSBA) degree program must also have completed 80 q.h. of credit, MTH 4110 and 4111 Mathematics 1 and 2 or their equivalents, and one social science course.

Students who meet these requirements may file an application for admission in the Office of Academic and Student Affairs or at any branch campus. Applications may also be submitted by mail. Call 617-437-2400 (voice) or 617-437-2825 (TTY) to obtain an application. Students will be notified of their acceptance by mail.

Option 2

Students who want to apply for admission but do not meet the above requirements must

- arrange an admission interview with an academic advisor, by calling 617-437-2400, (617-367-6373 Downtown or 617-272-5500 Burlington);
- complete an Option Two application for admission and bring it to the interview;
- bring an official copy of the high school transcript or GED certificate to the interview; and
- bring official copies of any college transcripts to the interview.

Interviews may be arranged at the Boston, Burlington and Liberty Square campuses only.

Option 2 candidates interested in Bachelor of Science in Business Administration (BSBA) programs will be

placed in Associate degree programs until they have met the Option 1 requirements for BSBA degrees.

Students who have been admitted to a degree program under Option 2 will have their transcripts reviewed after one academic year to ensure that they are making satisfactory academic progress. Satisfactory academic progress is defined as follows:

- completion of at least eighteen quarter hours of University College or transfer credit. This credit *must* include English courses ENG 4110, 4111, 4112, or their equivalents; and
- a minimum grade-point average of at least 2.0 (C) at University College.

The Office of Academic and Student Affairs will notify the Office of Financial Aid of those students who are not making satisfactory academic progress.

Academic Probation

All students are monitored once each academic year after the end of spring term. Students majoring in Nursing are also reviewed on a quarterly basis by the Academic Standing Committee of the College of Nursing. Students who have been admitted to a degree program must maintain an overall quality-point average of not less than 2.0 (C) and a 2.0 (C) average in the required major courses in order to be considered in good academic standing. Any degree student whose overall quality-point average or major course average falls below 2.0 is placed on academic probation for a one-year period. Students receive formal notification of their probation and the level of performance required to return them to good academic standing. Students on probation are encouraged

to meet with their assigned advisor at least once per term.

Students who do not raise their overall quality-point average or major concentration to 2.0 within the probationary period will have their cases referred to the University College Academic Standing Committee for review. This Committee has the power to remove students from their degree programs but allow them to continue taking courses at University College, or to dismiss them from University College.

Students who have been dismissed from University College must petition the Academic Standing Committee no sooner than one year from the date of dismissal if they wish to return to University College.

Additional Degree Status

Any student who has received a bachelor's degree from University College and wishes to earn a second bachelor's degree must fulfill an additional 45 quarter hours in residence after full completion of the first degree, at least 12 quarter hours of which must be in the new major concentration.

A student who has already received an associate's or bachelor's degree from University College and

who wishes to earn a second degree at the associate's level must fulfill an additional 24 quarter hours in residence after full completion of the first degree, at least 6 quarter hours of which must be in the new major concentration.

In either case, the additional degree and major must be distinctly different from the previously conferred degree. This policy does not apply to students earning an associate's degree who wish to go on for a bachelor's degree.

Certificates Contained Within Degrees

When a certificate is contained within a degree program (such as economics or graphic design), the grouping of certificate courses is treated like all other courses and the student receives a diploma only. However, if the student wishes to receive both a diploma and a

certificate, the higher standard for certificate courses (minimum 2.0 in each certificate course) will apply. Students must file a certificate completion petition separately in order to receive the certificate.

Change of Major

Students wishing to change majors within University College should file a Change of Major Petition with the Office of Academic and Student Affairs, 180 Ryder Hall. Petitions are available at all campus locations or by calling

617-437-2400 (voice), 617-437-2825 (TTY). Students who have received an associate's degree who are now working toward a bachelor's degree should be sure to change their majors to their new programs.

Changes in Requirements

The continuing development of University College requires frequent revisions. When no undue and unusual hardship is imposed on students because of these changes, students are expected to meet the requirements of the most current *Bulletin*. If a particular student finds it impossible to meet those requirements, the

Bulletin for the year in which he or she declared a major is binding. University College makes every effort to inform students who are admitted to a degree program of changes in the curriculum.

Academic programs, course content, and rules and regulations are subject to change without notice.

Course Substitutions

Students may request to replace a required course in an academic program with another comparable course. Although such requests are not encouraged, the University recognizes that students may occasionally have very good reasons for requesting such substitutions. Students must complete a Petition for Course Substitutions and submit it to the Office of Academic and Student Affairs. Petitions are available

at each campus location or by calling 617-437-2400 (voice), 617-437-2825 (TTY). Petitions are routinely forwarded to the appropriate program director. The program director reviews the request and notifies the student of the outcome. A copy of the completed request is kept in the student's file in the Office of Academic and Student Affairs.

Dean's List

All degree candidates who have taken a minimum of 18 quarter hours during the fall, winter, spring, and summer quarters, and who have completed this coursework with a quality-point average of 3.25 or better with no "I" grades, grades below C-, and no pass-fail grades (except where there is

no alternative or where required by the program) are placed on the Dean's List. These students receive certificates of commendation from the Dean of University College after the summer quarter has ended. See page 28 for information on graduation with honor.

In Absentia Status

If a student moves beyond a reasonable commuting distance from University College or its branch campuses and has completed one hundred thirty-five or more quarter hours of credit (at least 75 q.h. of which must have been taken at University College), the Committee on Academic Standing will consider a petition to allow the student to

complete his or her requirements for a University College degree at another approved college. The remaining courses must be completed within two years of the date of official *in absentia* status approval. The student must submit course descriptions to the Committee for approval prior to taking the courses.

Special Studies

Qualified students may have the opportunity to take up to six special studies. Those who meet the specifications described below may take a combination of:

- two advanced tutorials
- one field work
- three independent studies or
- three honors programs.

Petitions for these studies are available in the Program Offices, located on the second floor of Ryder Hall. Petitions should be filed at least six weeks prior to the quarter in which

the special study is to be taken.

Most special studies are taken under the direction of a faculty advisor who will meet with the student at least three times during the quarter, and will be available for frequent phone conferences. The language and lab tutorials will meet weekly. Students may request a specific faculty member, however, no special study may proceed without the Program Director's approval.

Special studies are not offered in all subject areas. To find out if they are

offered in your area of interest, check the course descriptions for your program in this *Bulletin*.

Before petitioning for a special study, you may wish to consult with your program office. In many cases, taking a full course will be of greater value to you.

Advanced Tutorial: The Advanced Tutorial is designed primarily for students with declared majors who have been unable to take a needed upper-level course in the usual format because the course has not been available for two consecutive years. The Advanced Tutorial is essentially a full course taken independently under the tutelage of a faculty advisor who will provide a syllabus, test the student's progress, and ascribe a grade. With the exception of languages and a few labs, Advanced Tutorials are 3 q.h. credits each.

Students may take no more than two Advanced Tutorials and should have completed 87 q.h. before petitioning.

Field Work: Field Work courses are designed to enhance career development by allowing students to earn credit for the application of their academic backgrounds to practical problems in the work place. Field Work courses are offered for qualified Business students and Liberal Arts majors. Please refer to individual course descriptions for details, including prerequisites.

A student must have a 3.0 cumulative average to be eligible and may take only one quarter of Field Work for 6 q.h. credits. Each student shall make his or her own arrangements for doing Field Work at an approved work site, and shall spend a minimum of fifteen hours per week at the site, whether on a paid or volunteer basis.

Each student shall meet with a departmental Field Work advisor at least five times per quarter in order to plan the project, monitor the student's progress, and present and discuss a final written report. The student's grade shall be dependent upon the quality of the experience as demonstrated by reports, work products, and other documentation and upon discussions between the U.C. faculty advisor and the work site supervisor.

Independent Study: The Independent Study is an opportunity for degree students who have completed 96 q.h. and maintained a 3.0 q.p.a. to undertake special research, reading, or experimental study projects in areas related to their major. In addition to filing a petition, interested students should submit a study proposal for the Program Director's approval. The proposal should include a detailed outline of the objectives and plan of study, and should be accompanied by a supporting statement from the faculty member under whose direction the study will take place. Students may take up to three Independent Studies at 3 q.h. each. Usually these courses would count toward major elective requirements.

Honors Program: The Honors Program is similar to the Independent Study, with two exceptions: the student must have a 3.5 q.p.a. to be eligible, and submit a more in-depth work product to earn the additional 1 q.h. credit.

Students may take up to three Honors Courses at 4 q.h. each. Usually these courses would count toward major elective requirements.

Please Note: Students may not take more than three of either independent studies or honors.

Status Reports

The Office of Academic and Student Affairs provides status reports for students who want to know where they stand in a particular academic program. Status Report Request forms are available at all campus locations and by calling 617-437-2400 (voice), 617-437-2825 (TTY).

No more than one status report for

the same program will be issued to a student in a given academic year. Requests are processed on a rolling basis.

Status reports are issued automatically

- when issuing the first transfer credit award; and
- when the student is changing majors.

Transfer Credit Policies and Procedures

Transfer Credit Policy

Students may transfer credit from accredited institutions of higher education when courses completed are applicable to the student's program in University College. The minimum course grade acceptable for transfer credit is C, or 2.0 on a four-point scale. Regardless of the source (APL, CLEP, PEP, noncollegiate instruction, coursework at other schools), the total amount of transfer credit that may be

awarded may not exceed 128 quarter hours. Courses for which transfer credit has been awarded may not be repeated at University College without a reduction in the transfer credit award. An accredited institution of higher education is an institution having recognition and membership in one of the six regional accrediting associations recognized by the Council on Post-Secondary Accreditation.

Transfer Credit Procedure

Students who would like to obtain an evaluation of credits earned from another institution must file a Transfer Credit Petition with the Office of Academic and Student Affairs. The student must then write to the registrar of the institution previously attended and request that an official transcript (one bearing that institution's seal) be forwarded to the Office of Academic and Student Affairs, University College, 180 Ryder Hall, Northeastern University, 360 Huntington Avenue, Boston, MA 02115. Upon receipt of official transcripts, the Office of Academic and Student Affairs issues an evaluation of all credits as they apply to the student's program in University College. Students should allow at

least three weeks for processing transfer credit petitions **from the point when all transcripts have been received**. Since the process of evaluating transfer credit is complex, students should not expect evaluations of their transcripts during advising appointments. Official awarding of credit is recorded on the student's University College transcript when admission to a degree program is approved. Students who wish to be admitted to a degree program may indicate this on the transfer credit petition and should attach proof of high school graduation (official high school transcript, or notarized copy of diploma or GED certificate). Please see page 18 for admissions requirements.

Validation of Required Upper-Level Business Courses for Transfer Credit

It may be necessary for students entering the Bachelor of Science in Business Administration (BSBA) degree program to validate required upper-level business courses that they have taken outside the framework of the program.

The Bachelor of Science in Business Administration degree programs offered by University College conform to all standards established by the American Assembly of Collegiate Schools of Business (AACSB). AACSB has been recognized by the Council for Post-Secondary Accreditation and by the United States Office of Education as the sole accrediting organization for university bachelor's and master's degree programs in business administration.

Validation is the set of procedures

that tests whether an upper-level course completed at the lower division of a bachelor's degree program should be accepted for transfer credit in the upper division of a bachelor's degree program recognized and approved by the AACSB.

In general, students are able to validate previously earned course credits by taking a sequential course, a department-approved examination, or a CLEP (College Level Examination Program) or PEP (Proficiency Examination Program) examination.

For more information on course validation, see page 65. Students should talk with a University College academic advisor for information about the validation of upper-level business courses for transfer credit.

Validation of Knowledge in Nursing

The College of Nursing endeavors to assess the clinical knowledge and skill of R.N. students in a variety of ways. Among these are standardized examinations developed by nationally recognized testing services. Upon successful completion of these examinations, R.N. students are eligible to

register for clinical nursing courses in which the ability of the student to apply nursing knowledge in the clinical area is validated. When the student has demonstrated achievement of both theoretical and clinical knowledge in nursing through these mechanisms, academic credit will be awarded.

Evaluation of International Educational Credentials

United States citizens and international students with Resident Alien status who have international high school or college credentials must file an International Educational Credentials Form and pay a \$45.00 evaluation fee. An evaluation for purposes of admission and/or transfer credit is issued by the Office of Academic and Student Affairs. Requirements include completion of an interview and receipt of the completed form, official copies of all transcripts translated into English and a check or bank draft for \$45.00

payable to Northeastern University. The official assessment of international educational credentials is made in accordance with current standards for awarding transfer credit at University College or as recommended by the Center for International Higher Education Documentation.

International students with non-immigrant status must file an International Student Application (see page 14, International Students) and will have any transfer credit evaluated as part of that process.

Course(s) at Another College or University

Students who are admitted to a degree program at University College and want to complete one or more courses at another institution for transfer purposes must first file a petition to enroll in such courses and provide course descriptions to the Office of Academic and Student Affairs. Courses taken at

other institutions may be disallowed unless a petition has been submitted and approved *in advance*. Students may not take courses at any other institution during their senior year for the purpose of transferring credit. See the section on Residence Requirement on page 28.

Credit by Examination

University College awards credit by examination, provided the examination does not duplicate previously earned academic credit. Credit is granted for successful completion of examinations currently available through the College Level Examination Program (CLEP) of the College Entrance Examination Board and through the Proficiency Examination Program (PEP) of the American College Testing Program. Both programs have been designed to help students obtain college-level credit for knowledge

acquired through nontraditional means, such as on-the-job training, educational television, or correspondence, extension, or independent study. University College defines a passing score as 500 on General Examinations and 50 on Subject Examinations. Information about these programs is available from the Office of Academic and Student Affairs at University College and from the Northeastern University Counseling and Testing Center.

Modern Language Proficiency Examination

Students may be eligible to receive credit for proficiency in a modern language. Examinations are currently offered in French, Spanish, German,

and Italian. Students should contact the Liberal Arts Program office, telephone 617-437-2416, for more information or an application form.

Assessment of Prior Learning (APL)

University College students may obtain up to 18 q.h. of APL credit in specified academic disciplines for knowledge gained through prior learning experiences, whether work-related or personal.

Specifically, students may be eligible for APL credit if they have accrued a foundation of knowledge and skills equivalent to the content of courses in the following areas:

- liberal arts (ART, ASL, DRA, ECN, ENG, HST, JRN, MUS, PHL, POL, PSY, SOA, SOC, SPC, TCC);
- health professions and sciences (BIO, CHM, HMG, HRA, HSC, MLS, RAD, REC); and
- business (MIS only).

The primary method for documenting prior learning is through the assessment of a student portfolio, although in many instances an examination will also be required.

The student must submit an Application for Assessment of Prior Learning, along with a non-refundable \$75 application fee made payable to Northeastern University. The application fee covers assessment and processing costs and is not tied to the granting of credit. Applications are available at 180 Ryder Hall, at any satellite location, or by calling 617-437-2400. Applications should be returned to the Director of Academic and Student Affairs, 180 Ryder Hall.

The application should include a written narrative, accompanied by documentation, to support the claim for prior learning credit for one or more courses. Assistance in planning for the documentation is available from academic advisors in the Office of Academic and Student Affairs. Appointments for this purpose can be made by calling 617-437-2400. In order to prepare documentation, students may want to review course syllabi available from the appropriate Program Office. Documentation may

include such evidence of accomplishment as published materials, writing samples, or copies of artistic works. Whenever possible, students should link prior learning to University College courses; however, when the appropriate course is critical to the academic soundness of a program, the student may be required to take the course, but may, in addition, receive APL credit as an elective credit in the related subject area.

Applications will be forwarded to the appropriate Program Office, where faculty, consultants, and program office staff will review them. Students will be notified if further documentation or an examination is necessary. Decisions on the applications will be forwarded to the Director of Academic and Student Affairs. Students will be notified of the outcome. Any credit awarded will appear as transfer credit on the transcript.

Students will be permitted to enter the APL program only after all traditional sources of transfer credit have been fully utilized. Students will not receive credit for courses that normally would not transfer to University College. If a course has a CLEP, PEP, or challenge examination available, students will be required to take the exam. Credits earned through the APL program may be applied to certificate programs as transfer credit, within the limit designated for the certificate.

Students are encouraged to apply for APL credit as early as possible in their program. All previous college credits must be transferred and a status report completed by the Office of Academic and Student Affairs before an APL application can be submitted. All portfolio evaluations must be completed six months prior to graduation.

Any student wishing to pursue APL credit should contact an advisor in the Office of Academic and Student Affairs 617-437-2400 to begin the application procedure.

Credit for Extra- institutional Learning

Extra-institutional learning is learning that takes place outside the sponsorship of legally authorized and accredited post-secondary educational institutions. The term applies to learning acquired from formal courses sponsored by associations, governments, business, and industry.

In awarding credit for extra-institutional learning, University College uses the *National Guide to Credit Recommendations for Noncollegiate Courses*, published by the American Council on Education, and *College Credit Recommendations: The Directory of the National Program on Non*

Collegiate Sponsored Instruction, published by the New York Board of Regents.

Students applying for credit for extra-institutional learning must submit a Transfer Credit Petition and provide official credentials from the sponsoring noneducational organization to the Office of Academic and Student Affairs. The credit may be applied toward degree requirements at University College if recommended in the *National Guide* or the *Directory*, provided credit is not otherwise obtainable through CLEP or PEP (see Credit by Examination).

Grading System Policies and Procedures

Grading System

A student's work in each course is evaluated by the instructor who awards a letter grade at the end of the quarter. This grade is officially recorded by the Registrar's Office. The grades and symbols used are given below, together with the numerical equivalents used for computing quality-point averages:

| | |
|----|---------|
| A | (4.000) |
| A- | (3.667) |
| B+ | (3.333) |
| B | (3.000) |

| | |
|----|----------------------------------|
| B- | (2.667) |
| C+ | (2.333) |
| C | (2.000) |
| C- | (1.667) |
| D+ | (1.333) |
| D | (1.000) |
| D- | (.667) |
| F | (0) |
| I | Incomplete |
| L | Audit (no credit) |
| S | Satisfactory (pass/fail grade) |
| U | Unsatisfactory (pass/fail grade) |
| X | Incomplete (pass/fail grade) |

* Grade not received

Change of Grade Policy

The period for clearing an "I" grade is restricted to one calendar year from the end of the quarter in which the course was originally taken. "I" grades outstanding for twelve months or longer shall remain permanently on all records.

Beginning with grades recorded at the end of Fall Quarter 1986, the

period for changing any grade is restricted to one calendar year from the end of the quarter in which the course was taken.

Requests for exceptions to this policy must be made to the University College Academic Standing Committee, 180 Ryder Hall.

Grade Reports and Transcripts

All efforts are made to mail grades prior to the beginning of the following quarter. A supplementary grade report is issued when a missing grade or a grade change is received. University regulations prohibit issuing grades by telephone. Grade reports of degree candidates indicate both their quarterly quality-point average and their cumulative quality-point average. Problems with grades not received (*) or grade changes that have not been

posted on transcripts should be addressed to the Program Office that administers the course.

Students may obtain a transcript of their grades by making a request *in writing* to the Registrar's Office, 117 Hayden Hall, Northeastern University, Boston, MA 02115. Unofficial transcripts are issued free of charge; official transcripts bearing the University seal cost \$2.

Incomplete ("I") Grades

The "I" grade, or incomplete, may be given only when the student fails to complete a major requirement of a course, such as a term paper or a final exam, but has been in regular attendance. Students who have missed a substantial number of class meetings without the instructor's permission receive a grade of "W". An instructor may decide that a student has done so poorly in the course that even a perfect grade in a make-up final examination could not raise the grade from "F"; in this case "F" is the proper grade, regardless of the missed final examination.

All deficiencies must be made up in

the manner prescribed by the instructor no later than twelve months following the recording of the "I" grade. Students requesting an exception to this policy must petition the University College Academic Standing Committee in writing. To remove an "I" grade, the instructor must file a change of grade form with the program office, to indicate the grade that the student is to receive. A student who elects to make up an "I" grade by taking the same course over again will be given a new grade and will be billed accordingly. The original "I" grade will remain on the student's record.

Missed Final Examinations

Students who miss a final examination are given a grade of "I" (incomplete) unless the student has done so poorly in the course that even a perfect grade on a make-up final could not raise the grade from "F", in which case an "F" shall be given as the proper grade. Students do not automatically have the right to make up a missed final examination. Students must petition for this privilege and pay a fee of \$50 for

Pass/Fail Grades

Satisfactory completion of work in all courses taken on a pass/fail basis is designated on the transcript by the letter "S". Unsatisfactory work is designated on the transcript by the letter "U". Any unsatisfactory grade must be handled according to the existing policy of University College but may never be cleared by enrolling in

Quality-Point Average

To obtain the quality-point average, the numerical equivalent of each grade received is multiplied by the credit hours earned, the quality points are added together, and the total quality-points are divided by the student's total quarter hours. An example follows:

| Grade Achieved | Numerical Equivalent | Credit Hours | Quality Points |
|----------------|----------------------|--------------|----------------|
| A | 4.000 | 3 | 12.0 |
| B- | 2.667 | 3 | 8.0 |
| C | 2.000 | 6 | 12.0 |
| F | 0.000 | 3 | 0.0 |

Total Quality Points (32.0)

Quality-Point Average =

Total Credit Hours (15) = 2.13

The quality-point average is equal to the total quality points (in this case,

each make-up examination. Petitions are available at each campus location or by calling 617-437-2425. Students are notified whether or not their petitions have been approved prior to the date of the make-up examination.

Students who make up a missed final examination will have the appropriate letter or pass/fail grade substituted for the "I" grade on their transcripts.

the same course on the basis of the pass/fail system of grading.

An incomplete in a course taken on a pass/fail basis is designated by the letter "X" on the transcript and is treated according to the normal procedure for grades of incomplete.

Please see also Pass/Fail Courses on page 14.

32.0) divided by the total credit hours (15), which comes to an average of 2.13.

Pass/fail grades (S, U, and X), incompletes (I), and audits (L) are not included in the quality-point average. Similarly, transfer credits are not included in quality-point averages. However, the total earned hours appearing on the student's transcript include both transfer credits and "S" grades.

A cumulative quality-point average below 2.0 is unacceptable and does not allow a student to continue in University College or to receive a degree from Northeastern University. The "F" grade is a failure and requires repetition of the course in its entirety.

Graduation Policies and Procedures

| | | | | | | | | |
|---|--|--|-----------------------|--------------|----------------------------|--------------|-------------------------------|--------------|
| Residence Requirement | Every candidate for the bachelor's or associate's degree must fulfill the minimum residence requirement, which is defined as the satisfactory completion of at least forty-five quarter hours of course work for the bachelor's degree, or twenty-four quarter hours of course work for the associate's degree, in University College <i>immediately preceding graduation</i> . At least twelve of the forty-five quarter hours, or six of the twenty-four, must be in the | candidate's major field of study. Because of this residence requirement, students may not take courses at any other institution during their senior year for the purpose of transferring credit. Students whose enrollment in a degree program is interrupted for a period of one year or more will be reinstated in that program or a comparable program at the time of re-entry into University College. | | | | | | |
| Graduation Requirements | Except for certain health professions programs, the requirement for graduation from University College is 174 quarter hours for a bachelor's degree and 96 quarter hours for an associate's degree, with attainment of an overall quality-point average of 2.0 (C). In addition, the student must have a 2.0 average in the required major courses. Bachelor of Science in Business Administration degree candidates must | also meet all validation requirements. Although the credits allowed for acceptable work completed elsewhere by transfer students count toward fulfillment of quantitative graduation requirements, neither the credits nor the grades earned in such courses are included in the quality-point computations for graduation. Course requirements for each degree are outlined in this <i>Bulletin</i> . | | | | | | |
| Graduation with Honor | Graduation with honor is reserved for bachelor's degree candidates who have completed a minimum of 72 quarter hours of work at University College and who have demonstrated distinctly superior academic achievement as evidenced by the following quality-point averages: | <table><tr><td>Graduation with Honor</td><td>3.25 to 3.49</td></tr><tr><td>Graduation with High Honor</td><td>3.50 to 3.74</td></tr><tr><td>Graduation with Highest Honor</td><td>3.75 to 4.00</td></tr></table> <p>Courses transferred from another educational institution are not considered in determining honors.</p> | Graduation with Honor | 3.25 to 3.49 | Graduation with High Honor | 3.50 to 3.74 | Graduation with Highest Honor | 3.75 to 4.00 |
| Graduation with Honor | 3.25 to 3.49 | | | | | | | |
| Graduation with High Honor | 3.50 to 3.74 | | | | | | | |
| Graduation with Highest Honor | 3.75 to 4.00 | | | | | | | |
| Credit by Examination During the Senior Year | CLEP or PEP examinations (see page 23) may be taken by students during their final year of study provided they have met the forty-five or twenty-four quarter-hour residence requirement for graduation described above. Because of the time it takes for CLEP and PEP examinations to be graded and returned to the University, | students requesting June graduation must take their CLEP and PEP examinations no later than the winter quarter of their senior year, and students requesting September commencement must take their examinations no later than the spring term of their senior year. | | | | | | |
| Senior Status Procedure | Each student who intends to graduate during the current academic year must notify the Office of Academic and Student Affairs of his or her intention to graduate by filing for a senior status report. Senior status reports are issued to assist students with selecting the courses they need to complete their program requirements. Seniors are encouraged to request their senior status | reports during the summer prior to the academic year in which they plan to graduate. Petition forms are available at each campus location or by calling 617-437-2400 (voice) or 617-437-2825 (TTY). At this time, seniors are also encouraged to clear up missing grades, incompletes, transfer credit, admissions, or other problems. Once a Senior Status Report has been completed, the Office of Academic | | | | | | |

and Student Affairs mails a Commencement Data Card, which the student *must* return by the date specified

Academic Audit of Seniors

The Office of Academic and Student Affairs conducts an academic audit of all seniors approximately one month prior to graduation. During this audit, academic problems such as incompletes, missing grades, missing courses, or validation problems are

on the card to be guaranteed inclusion on the official graduation list.

noted. Every effort is made to relay this information to the student through mail and telephone contact. If these problems remain unresolved, seniors are notified by certified mail that they have failed to qualify for their degree.

Commencement Ceremony

Information concerning commencement is mailed to all seniors who have returned a Commencement Data Card (see Senior Status, page 28) during the spring term, for June graduation, or the summer term, for September graduation.

Attendance at Commencement for all University College degree candidates is optional. Students who do not attend Commencement should

receive their diplomas by mail approximately six to eight weeks after the ceremony.

Students must have cleared all academic, financial, and/or disciplinary deficiencies in order to graduate. Students who have questions about the commencement ceremony should direct them to the Commencement Office, 617-437-3190.

Programs of Study

Overview

At University College, your options are almost unlimited. Our programs of study can take you in any direction you determine toward the fulfillment of your professional or personal objectives. You may enroll as a student pursuing a degree program or as a nondegree student taking a single course or a special program.

Our programs leading to the Bachelor of Science, Bachelor of Science in Business Administration, and Bachelor of Arts degrees provide opportunities for cultural and professional development equivalent in quality and scope to those offered in the conventional four-year college enrolling full-time students. The bachelor's degree requires 174 quarter hours of credit or more.

Business Administration

Accounting

Associate in Science 67
Bachelor of Science in Business Administration 76
Certificate 37

Business Administration

Associate in Science 68
Certificate 39

Compensation and Benefits Management

Certificate 40

Computer Programming and Systems Analysis

Certificate 40

Computer Systems Specialist Program

Certificate 41

Culinary Arts (Chef's Institute)

Certificate 42

Electronic Composition

Certificate 43

Executive Management

Certificate 55

Finance

Associate in Science 69
Bachelor of Science in Business Administration 77
Certificate 43

Programs leading to the Associate in Science degree enable students to establish a knowledge base in business administration, criminal justice and security, health professions and sciences, or liberal arts. The associate's degree requires 96 quarter hours of credit and is equivalent to the conventional two-year, or junior community college program in scope and quality. University College also offers certificate programs in a wide range of disciplines.

Degree and certificate programs are offered in the following areas. (The numbers indicate the page on which detailed curricula appear.)

Food Service Management

Certificate 43
National Institute for the Food Industry Certification 57

Hotel and Restaurant Management

Associate in Science 70
Certificate 44

Human Resources Management

Associate in Science 70
Certificate 46

International Business

Certificate 56

Management

Bachelor of Science in Business Administration 80
Certificate 47

Management Information Systems

Associate in Science 71
Bachelor of Science in Business Administration 81

Marketing

Associate in Science 72
Bachelor of Science in Business Administration 83
Certificate 47

Microcomputer Software Specialist

Certificate 47

Operations Management

Associate in Science 73

Certificate 48

Operations TechnologyBachelor of Science (Operations
Technology Concentration) 78Bachelor of Science (Electronic
Publishing Technology

Concentration) 79

Certificate (Operations

Management) 48

Certificate (Quality Management) 49

Preparation for National**Certification**

APICS 57

NAPM 58

National Institute for the Food

Industry Certification 57

Preparation for State Certification

Real Estate Salesperson Examination

Preparation 58

Purchasing and Materials**Management**

Associate in Science 73

APICS Examination Preparation 57

NAPM Examination Preparation 58

Certificate 49

Quality Management

Certificate 49

Real Estate

Associate in Science 74

Certificate 49

Salesperson Examination

Preparation 58

Small Business Management

Certificate 50

Transition Programs

Career Transition 57

Transition to Higher Education 58

Transportation and Physical**Distribution Management**

Associate in Science 74

Certificate 52

**Criminal
Justice and
Security****Corrections**

Associate in Science 86

Bachelor of Science 87

Law and Criminal Justice

Certificate 46

Policing

Associate in Science 88

Bachelor of Science 88

Certificate 48

Security

Associate in Science 89

Bachelor of Science 90

Security Administration

Certificate 50

Security Technology

Certificate 50

**Health
Professions
and Sciences****Biomedical Illustration**

Certificate 38

Biotechnology

Associate in Science 94

Bachelor of Science 94

Health Management

Bachelor of Science 95

Option in Continuing Care

Administration 96

Option in Community Health

Management 96

General Option 97

Health Record Administration

Bachelor of Science 98

Post Baccalaureate Certificate 99

Health Science

Bachelor of Science 99

Human Development Services

Certificate with concentrations in: 45

Adolescent Care

Gerontology

Infant/Child Care

Learning Disabilities

Medical Laboratory Science

Associate in Science 102

Phlebotomy Certification

Preparation 58

Nursing

Bachelor of Science in Nursing

(in affiliation with the

College of Nursing) 103

Paramedic Technology

Associate in Science 104

EMT-Basic Program 59

Radiologic Technology

Associate in Science 105

Ultrasonographic Studies

Certificate 52

Therapeutic Recreation Services

Activity Leader Certificate 108

Associate in Science 108

Liberal Arts

Acting

Certificate 37

Advertising

Certificate 37

American Sign Language and Deaf Studies

Certificate 38

American Sign Language-English Interpreting

Certificate 54

Arts and Sciences

Associate in Science 112

Business Communication

Certificate 39

Computer Graphic Design

Certificate 42

Economics

Bachelor of Arts 113

Bachelor of Science 113

English

Bachelor of Arts 114

Bachelor of Science 114

Fine Arts

Bachelor of Arts 115

Bachelor of Science 116

Graphic Design and Visual Communication

Associate in Science 116

Bachelor of Science 117

Certificate 44

History

Bachelor of Arts 118

Bachelor of Science 118

Journalism

Advertising Certificate 37

Public Relations Certificate 48

Liberal Studies

Bachelor of Arts 120

Political Science

Bachelor of Arts 121

Bachelor of Science 122

Psychology

Bachelor of Arts 123

Bachelor of Science 124

Public Relations

Certificate 48

Sociology-Anthropology

Bachelor of Arts 124

Bachelor of Science 125

Speech Communication

Certificate 51

Technical Communications

Bachelor of Science 126

Technical Writing

Certificate 51

Writing

Certificate 53

Course descriptions are listed in alphabetical order by subject area beginning on page 130.

Certificate and Special Programs

University College offers a variety of certificate and special programs designed to meet the needs of individuals who seek to acquire a foundation of knowledge for one or more of the following purposes, rather than take the traditional course sequence of a degree program:

- to develop and enhance job-related skills;
- to prepare for a professional examination;
- to ease the transition back to school.

Students enrolling in our *certificate programs* include

- individuals who prefer to focus on a specialized area of study before deciding to pursue a degree;
- individuals who plan to complete an associate's degree but first want to acquire the marketable skills offered in a certificate program;
- individuals who seek intensive study in a discipline but who do not wish to acquire a degree; and
- individuals who already hold a degree but wish to acquire specialized knowledge for a career change or professional development.

Students enrolled in our *special programs* include

- individuals who seek to prepare for a licensing exam to gain entry into a profession;
- practicing professionals who seek certification in a new or known specialization to increase their competencies on the job or advance their careers; and
- individuals who are entering college for the first time, or after a long lapse of time, and seek a special study plan to ease the transition.

Students entering a certificate program should file a certificate petition with the Office of Academic and Student Affairs. When they have completed all coursework toward their certificates, they should file a Certificate Completion Form. Petitions are available from the Office of Academic and Student Affairs, 180 Ryder Hall, 617-437-2400, and at all campus locations.

For assistance in determining course prerequisites or in deciding on the appropriate program, call 617-437-2400 for an appointment with an academic advisor, or call the number listed for each individual certificate program.

Most certificate programs are designed to facilitate transfer into a related degree program. In addition, a limited amount of transfer credit for introductory courses taken at another school may be applied toward certificate program requirements. The number of transfer credits permitted varies by certificate but is usually limited to 9 quarter hours.

Students who choose to complete a second certificate in a subject related to the first may find that the two have certain courses in common. However, a second certificate will not be awarded if more than 50 percent of the course work is duplicated.

On occasion, students have good reasons for requesting permission to replace a required course with a substitute course. Permission to substitute a course must be granted by the appropriate program office. Students should submit a completed Petition for Course Substitutions to the appropriate office. Petitions are available at all campus locations.

Beginning with courses taken Fall term 1987, students must achieve a grade of C (2.0) or better in each course in order to receive a certificate.

A listing of the diversified certificate and special programs available in University College follows.

Certificate Programs

- Accounting
- Acting
- Advertising
- American Sign Language and Deaf Studies
- Biomedical Illustration
- Business Administration
- Business Communication
- Compensation and Benefits Management
- Computer Graphic Design
- Computer Programming and Systems Analysis
- Computer Systems Specialist
- Culinary Arts
- Electronic Composition
- Finance
- Food Service Management
- Graphic Design and Visual Communication
- Hotel and Restaurant Management
- Human Development Services
- Human Resources Management
- Law and Criminal Justice
- Management
- Marketing
- Microcomputer Software Specialist
- Operations Management
- Policing
- Public Relations
- Purchasing and Materials Management
- Quality Management
- Real Estate
- Security Administration
- Security Technology
- Small Business Management
- Speech Communication
- Technical Writing
- Transportation and Physical Distribution Management
- Ultrasonographic Studies
- Writing

Intermediate and Advanced Certificate Programs

- Activity Leader Certificate Program
- American Sign Language-English Interpreting
- Executive Management
- Health Record Administration Certificate
- International Business

Special Programs

- APICS Exam Preparation
- Career Transition
- EMT/Basic
- Health Record Administration Post-Baccalaureate Certificate
- NAPM Exam Preparation
- National Institute for the Food Industry Certification
- Phlebotomy Certification
- Real Estate Broker or Salesperson Exam Preparation
- Transition to Higher Education

Certificate Programs

Accounting Certificate Program



This program enables students to gain a foundation of knowledge in the accounting field, including how to compile, analyze, and prepare critical business and financial records.

| | | | | quarter hours |
|----------------------------|----------|----------|----------------------------------|--|
| ACC 4101 | ACC 4102 | ACC 4103 | Accounting Principles 1, 2, 3 | 9 |
| ACC 4301 | ACC 4302 | ACC 4307 | Intermediate Accounting 1, 2, 3* | 9 |
| ACC 4310 | or | ACC 4410 | Cost Accounting 1 | 3 |
| ACC 4900 | | | Field Work (optional) | (6) |
| FI 4301 | or | FI 4401 | Principles of Finance | 3 |
| Total Quarter Hours | | | | (Possible transfer credit: 9 quarter hours) 24-30 |

For more information, call 617-437-2418.
 *Or students may select ACC 4401, ACC 4402 and ACC 4407.

Acting Certificate Program



This program allows students to lay a foundation for further acting experience and career opportunities through participation in a variety of drama courses.

| | | | | quarter hours |
|----------------------------|----------|--|-----------------------------|---|
| DRA 4101 | | | Introduction to Theatre | 3 |
| DRA 4140 | DRA 4141 | | Introduction to Acting 1, 2 | 6 |
| DRA 4151 | | | Acting for the Camera* | 3 |
| DRA 4152 | | | Acting for Commercials* | 3 |
| DRA 4153 | | | Acting for Voice Overs* | 3 |
| DRA 4250 | | | Theatre Movement | 3 |
| DRA 4260 | | | Theatre Speech | 3 |
| Total Quarter Hours | | | | (Possible transfer credit: 9 quarter hours) 24 |

For more information, call 617-437-2416 or 617-437-2423.
 *3 1/2-hour studio.

Advertising Certificate Program



This program emphasizes the acquisition of skills that allow students to seek professional experience in such fields as copywriting, layout and design, and corporate advertising.

| | | | | quarter hours |
|-----------------------------|----|----------|---|---|
| JRN 4112 | | | Writing for Media 1 | 3 |
| JRN 4349 | | | Advertising Basics | 3 |
| JRN 4350 | | | Advertising Copywriting | 3 |
| JRN 4351 | | | Advertising Practice | 3 |
| ART 4115 | | | Graphic Design for Non-Majors* | 3 |
| ART 4143 | | | Advertising Design* | 3 |
| MTH 4520 | | | Statistical Thinking | 3 |
| MKT 4301 | or | MKT 4401 | Introduction to Marketing 1 | 3 |
| <i>Choose one elective.</i> | | | | |
| MKT 4302 | or | MKT 4402 | Introduction to Marketing 2 | (3) |
| MKT 4310 | or | MKT 4410 | Advertising Management 1 | (3) |
| JRN 4300 | | | Photojournalism | (3) |
| ART 4160 | | | Basic Photography* | (3) |
| MGT 4101 | | | Introduction to Business and Management 1 | (3) |
| Total Quarter Hours | | | | (Possible transfer credit: 9 quarter hours) 27 |

For more information, call 617-437-2416 or 617-437-2423.
 * 3 1/2-hour studio.

American Sign Language and Deaf Studies Certificate Program



This program introduces signing, gives students the chance to practice and gain confidence in communicating with the hearing-impaired, and allows students to explore the language and culture of the American deaf community. (For more advanced program, please see ASL-English Interpreting Certificate, page 54).

| | | quarter hours |
|----------|----------|--|
| ASL 4101 | ASL 4102 | American Sign Language 1, 2* 8 |
| ASL 4201 | ASL 4202 | Intermediate American Sign Language 1, 2 8 |
| ASL 4301 | ASL 4302 | Advanced American Sign Language Proficiency 1, 2 8 |
| ASL 4412 | | American Deaf Culture 3 |
| ASL 4410 | | Linguistics of American Sign Language 3 |
| ASL 4411 | | Deaf History (3) |
| or | | or |
| ASL 4413 | | Deaf Literature (3) |

Total Quarter Hours (Possible transfer credit for ASL 4101 and ASL 4102: 8 quarter hours; all other credits must be completed in residence; a 3.0 cumulative grade-point average is required to receive this certificate.) **33**

*An Advanced Placement examination is available for this course.

If ASL 4101 or ASL 4102 is waived, a substitution must be made so that the quarter hours earned still total 33. If you enter the program beginning with ASL 2 (ASL 4102) as your first class (having tested out of ASL 1 - ASL 4101), you will be required to take *both* Deaf History (ASL 4411) *and* ASL Deaf Literature (ASL 4413) to meet all the credit requirements for the ASL and Deaf Studies Certificate.

For more information, call 617-437-3064 (voice) or 617-437-3067 (TTY).

Biomedical Illustration Certificate Program



This program is designed to offer students the ability to explore the techniques of biomedical illustration. It will allow individuals with either a science or art background to integrate the other aspect. The student will also be able to develop a portfolio with the emphasis on biomedical illustration.

| | | quarter hours |
|--------------------|----------|--|
| ART 4121 | | Principles of Drawing and Composition* 3 |
| ART 4122 | | Introduction to Figure Drawing* 3 |
| ART 4123 | | Drawing Workshop* 3 |
| BIO 4175 | | Human Anatomy and Physiology 1 3 |
| BIO 4374 | | Histology 1 3 |
| BIO 4420 | | Biomedical Illustration 4 |
| BIO 4801 | | Independent Study in Biology 4 |
| <i>Recommended</i> | | |
| ART 4112 | | Visual Foundations* (3) |
| ART 4140 | | Graphic Communication and Production (3) |
| BIO 4375 | BIO 4376 | Histology 2, 3 (6) |

Total Quarter Hours (Possible transfer credit: 9 quarter hours) **23-35**

For more information call 617-437-2818.

*3 1/2-hour studio.

Business Administration Certificate Program



This program is designed to help students get started or catch up on the basics of business. The program is often taken as a foundation for further study of the various facets of business administration.

| | | | | quarter hours |
|----------------------------|----------|----------|---|---------------|
| ACC 4101 | | | Accounting Principles 1 | 3 |
| ECN 4115 | | | Economic Principles and Problems 1 | 3 |
| FI 4301 | or | FI 4401 | Principles of Finance | 3 |
| HRM 4301 | or | HRM 4401 | Organizational Behavior | 3 |
| MIS 4101 | | | Introduction to Data Processing and Information Systems 1 | 3 |
| MKT 4301 | or | MKT 4401 | Introduction to Marketing 1 | 3 |
| MGT 4101 | MGT 4102 | | Introduction to Business and Management 1, 2 | 6 |
| or | | | or | |
| MGT 4105 | | | Introduction to Business and Management Intensive (may be taken in lieu of MGT 4101 and 4102) | (6) |
| MGT 4323 | | | Management and Leadership | 3 |
| MGT 4900 | | | Field Work (optional) | (6) |
| SPC 4101 | | | Fundamentals of Human Communication | 3 |
| Total Quarter Hours | | | (Possible transfer credit: 9 quarter hours) | 30-36 |

For more information, call 617-437-2418.

Business Communication Certificate Program



This program is built around the premise that effective communication in a variety of business situations is a key factor in career satisfaction and advancement.

| | | | | quarter hours |
|-----------------------------------|--|--|---|---------------|
| JRN 4335 | | | Public Relations Basics | (3) |
| or | | | or | |
| MKT 4335 | | | Public Relations 1 | (3) |
| MGT 4101 | | | Introduction to Business and Management 1 | 3 |
| SPC 4102 | | | Group Discussion | 3 |
| SPC 4152 | | | Interviewing | 3 |
| SPC 4153 | | | Techniques of Persuasion | 3 |
| SPC 4154 | | | Negotiation Skills | 3 |
| SPC 4155 | | | Organizational Communication | 3 |
| SPC 4251 | | | Business and Professional Speaking | 3 |
| <i>Choose one writing course,</i> | | | | |
| ENG 4380 | | | Business Writing and Reports 1 | (3) |
| JRN 4112 | | | Writing for Media 1 | (3) |
| TCC 4101 | | | Technical Writing 1 | (3) |

or choose any acceptable substitute in written communication, with prior approval of the department consultant or program director.

| | | |
|----------------------------|---|-----------|
| Total Quarter Hours | (Possible transfer credit: 9 quarter hours) | 27 |
|----------------------------|---|-----------|

For more information call 617-437-2416 or 617-437-2423.

Compensation and Benefits Management Certificate Program



This program offers students the opportunity to learn about the increasingly important and complex role of benefits management in the organization.

| | | | quarter hours |
|----------------------------|----------|--|---|
| HRM 4310 | HRM 4311 | Personnel Management 1, 2* | 6 |
| HRM 4321 | | Wage and Salary Administration | 3 |
| HRM 4322 | | Employee Benefits | 3 |
| HRM 4323 | | Job Evaluation | 3 |
| HRM 4330 | HRM 4331 | Employment Rights 1, 2* | 6 |
| | | Elective in Human Resources Management | 3 |
| HRM 4900 | | Field Work (optional) | (6) |
| Total Quarter Hours | | | 24-30 |
| | | | (Possible transfer credit: 9 quarter hours) |

For more information, call 617-437-2418.
 *This certificate may be taken by students who have also completed the Human Resources Management Certificate. Asterisked courses do not have to be repeated.

Computer Programming and Systems Analysis Certificate Program



This program enhances career prospects by providing a concrete knowledge base in programming, and at the same time by helping students to keep up with new developments in this fast-paced field.

| | | | quarter hours |
|----------------------------|----------|--|---|
| MIS 4101 | MIS 4102 | Introduction to Data Processing and Information Systems 1, 2 | 6 |
| MIS 4221 | MIS 4222 | MIS 4223 | COBOL Programming 1, 2, 3 |
| MIS 4230 | | | PC Software for Professionals (3) |
| or | or | or | |
| MIS 4236 | | | Advanced PC Software (3) |
| MIS 4241 | MIS 4242 | | Programming in BASIC 1, 2 |
| MIS 4301 | or | MIS 4401 | Structured Systems Analysis and Design 1 |
| | | | 3 |
| MIS 4302 | or | MIS 4402 | Structured Systems Analysis and Design 2 |
| | | | 3 |
| MIS 4900 | | Field Work (optional) | (6) |
| Total Quarter Hours | | | 30-36 |
| | | | (Possible transfer credit: 9 quarter hours) |

This certificate differs from the Computer Systems Specialist Program (described next) in that the courses for this certificate are regularly offered at all campuses and may be completed over a longer period of time than in the Specialist Program. For more information about both programs, call 617-437-2418.

Computer Systems Specialist Program



The Program

This program is designed to offer students training as computer systems specialists. Intended for students who are interested in entry-level programming positions in business and industry, the program addresses the career goals of individuals who have little or no academic or work-related background in computer programming. Students who successfully complete the program receive a Computer Systems Specialist certificate.

Admission

Computer Systems Specialist Program candidates will be evaluated for acceptance into the program on the basis of their transcripts from high school or most recently attended college, motivation, and expressed goals. Enrollment is limited. This program is offered only if a sufficient number of qualified candidates apply.

Time and Place

The program is scheduled twice during the academic year, in the fall and spring quarters. Classes are scheduled for thirty one weekends: Friday, 6 to 10 p.m., and all day Saturday, 9 a.m. to

5:30 p.m. Sections are offered at the Burlington campus.

Academic Credit and Certification

Upon satisfactory completion of the program, students will have accumulated forty-five quarter hours of academic credit, and will receive the program certificate. The credits represent 26 percent of the credits necessary for a bachelor's degree.

Placement Assistance

Although job placement is not guaranteed, most students who successfully complete the program find suitable employment. Placement services include individual counseling; job-search seminars on career opportunities, self-assessment, resume preparation, and interviewing skills; and resume referrals to employers.

For More Information

For more information about the program and an application form, contact the Business Administration Programs Office, Northeastern University, University College, 360 Huntington Avenue, Boston, Massachusetts 02115, telephone 617-437-2418.

Courses include the following:

| | | | quarter hours | |
|---------------------|----------|--|-------------------------------|---|
| MIS 4101 | MIS 4102 | Introduction to Data Processing and Information Systems 1, 2 | 6 | |
| MGT 4101 | MGT 4102 | Introduction to Business and Management 1, 2 | 6 | |
| MIS 4221 | MIS 4222 | MIS 4223 | COBOL Programming 1, 2, 3 | 9 |
| MIS 4235 | | | Advanced COBOL Programming | 3 |
| MIS 4236 | | | Advanced PC Software | 3 |
| MIS 4241 | | | Programming in BASIC 1 | 3 |
| MIS 4273 | | | PC DOS | 3 |
| MIS 4301 | MIS 4302 | Structured Systems Analysis and Design 1, 2 | 6 | |
| MIS 4307 | | | Communications and Networking | 3 |
| MIS 4345* | | | Database Management Systems | 3 |
| Total Quarter Hours | | | 45 | |

*For course description see MIS 4445.

Computer Graphic Design Certificate Program



This program addresses the needs of both novice and professional designers seeking to pursue careers in the area of electronic graphic design. While the core curriculum is structured for students who have little or no computer experience, professional designers, subject to the approval of the Program Director, may substitute more advanced design or computer electives for up to three basic design courses.

Some courses will be offered only on the Boston campus. Up to nine hours of APL (Assessment of Prior Learning) credit can be applied to the certificate.

| | | | quarter hours |
|----------------------------|----------|--|---|
| ART 4135 | | Design Foundations and Techniques* | 3 |
| ART 4140 | | Graphic Communication and Production | 3 |
| ART 4141 | ART 4142 | Graphic Design 1*, 2* | 6 |
| ART 4151 | | Typography | 3 |
| ART 4181 | | Introduction to Computer-Aided Graphic Design* | 3 |
| ART 4182 | | Computer-Aided Graphic Design Workshop* | 3 |
| ART 4183 | | Electronic Publishing Design* | 3 |
| ART 4184 | | Business Presentation Graphics* | 3 |
| ART 4185 | | Creative Imaging: Custom Computer Design* | 3 |
| ART 4186 | | Computer Graphic Design Portfolio* | 3 |
| <i>Recommended</i> | | | |
| ART 4187 | ART 4188 | ART 4189 | Graphic Software Studies 1, 2, 3* (9) |
| Total Quarter Hours | | | (Possible transfer credit: 9 quarter hours) 33 |

For more information, call 617-437-2390.

*3 1/2-hour studio.

Culinary Arts (Chef's Institute) Certificate Program



Combining "hands-on" courses in food preparation with academic management courses, this program is designed for people who want to get into the restaurant business. By passing an equivalency exam, students may substitute their experience for some of the basic courses.

| | | | quarter hours |
|----------------------------|--|--|--|
| HTL 4304 | | Hotel and Restaurant Law | (3) |
| or | | or | |
| HTL 4309 | | Managerial Accounting for the Hospitality Industry | (3) |
| HTL 4307 | | Food Service Sanitation | 3 |
| HTL 4308 | | Food and Beverage Cost Control | 3 |
| HTL 4320 | | Food Preparation Intensive | 6 |
| HTL 4322 | | Consumer Food Preparation | 3 |
| HTL 4324 | | Dining Room Beverage Operation and Preparation | 3 |
| HTL 4330 | | Advanced Catering/Garde Manger | 6 |
| HTL 4331 | | Professional Chef's Training | 6 |
| HTL 4900 | | Field Work (optional) | (6) |
| Total Quarter Hours | | | (Possible transfer credit: 9 quarter hours) 33-39 |

For more information, call 617-437-2418.

Electronic Composition Certificate Program



This certificate program is designed to help students develop skills in starting up, advising, managing, and creating systems for the growing field of desk top publishing operations.

| | quarter hours |
|----------------------------|--|
| ART 4115 | Graphic Design for Non-Majors* 3 |
| ART 4139 | Color Theory and Practice 3 |
| ART 4140 | Graphic Communication and Production 3 |
| ART 4151 | Typography 3 |
| ART 4181 | Introduction to Computer-Aided Graphic Design* 3 |
| ART 4366 | Promotional and Technical Publications Design and Production 3 |
| ART 4410 | Electronic Imaging Systems 3 |
| ART 4415 | Electronic Document Production 3 |
| ART 4416 | Style Set-up for Electronic Document Production* 3 |
| ART 4431 | Graphic Composition Systems 1* 3 |
| Total Quarter Hours | 30 (Possible transfer credit: 9 quarter hours) |

For more information, call 617-437-2418.

* 3 1/2-hour studio.

Finance Certificate Program



This program will help students get the skills they need to assume more responsibility on the job, advance to a management position, or seek new opportunities in banks, corporations, brokerage firms, schools, and government and social agencies.

| | | | | quarter hours |
|----------------------------|----------|---|-------------------------------|---------------|
| ACC 4101 | ACC 4102 | ACC 4103 | Accounting Principles 1, 2, 3 | 9 |
| FI 4301 | or | FI 4401 | Principles of Finance | 3 |
| FI 4302 | or | FI 4402 | Financial Management | 3 |
| FI 4310 | or | FI 4410 | Investment Principles | 3 |
| FI 4320 | or | FI 4420 | Credit Principles | 3 |
| FI 4325 | or | FI 4425 | Budgeting and Planning | 3 |
| FI 4900 | | | Field Work (optional) | (6) |
| Total Quarter Hours | | (Possible transfer credit: 9 quarter hours) | | 24-30 |

For more information, call 617-437-2418.

Food Service Management Certificate Program



This certificate program is designed to prepare current and potential restaurant owners and managers to run cost effective operations that meet professional standards.

| | quarter hours |
|----------------------------|--|
| HTL 4301 | Introduction to Hotel and Restaurant Management 3 |
| HTL 4304 | Hotel and Restaurant Law 3 |
| HTL 4307 | Food Service Sanitation 3 |
| HTL 4308 | Food and Beverage Cost Control 3 |
| HTL 4309 | Managerial Accounting for the Hospitality Industry 3 |
| HTL 4320 | Food Preparation (Intensive) 6 |
| HTL 4322 | Consumer Food Preparation 3 |
| HTL 4324 | Dining Room Beverage Operations 3 |
| HTL 4900 | Field Work (optional) (6) |
| Total Quarter Hours | 27-33 (Possible transfer credit: 9 quarter hours) |

For more information, call 617-437-2418

Graphic Design and Visual Communication Certificate Program



This program offers students a comprehensive background in skills necessary for entry into various positions in advertising, publishing, marketing, public relations, and media industries.

| | | quarter hours |
|------------------------|--------------------------------------|---------------|
| ART 4135 | Design Foundations and Techniques* | 3 |
| ART 4139 | Color Theory and Practice | 3 |
| ART 4140 | Graphic Communication and Production | 3 |
| ART 4141 ART 4142 | Graphic Design 1*, 2* | 6 |
| ART 4143 | Advertising Design* | 3 |
| ART 4151 | Typography | 3 |
| ART 4251 | Advanced Graphic Design* | 3 |
| ART 4367 | Illustration | 3 |
| JRN 4349 | Advertising Basics | 3 |

Total Quarter Hours (Possible transfer credit: 9 quarter hours; possible APL credit: 9 quarter hours. See p. 24) **30**

For more information, call 617-437-2416 or 617-437-2423.

*3 1/2-hour studio.

Hotel and Restaurant Management Certificate Program



This program focuses on the unique combination of hospitality and management within this people-centered profession.

| | | quarter hours |
|----------|--|---------------|
| HTL 4301 | Introduction to Hotel and Restaurant Management | 3 |
| HTL 4303 | Front Office Management | 3 |
| HTL 4304 | Hotel and Restaurant Law | 3 |
| HTL 4307 | Food Service Sanitation | 3 |
| HTL 4308 | Food and Beverage Cost Control | 3 |
| HTL 4309 | Managerial Accounting for the Hospitality Industry | 3 |
| HTL 4313 | Introduction to Tourism | 3 |
| HTL 4320 | Food Preparation Intensive | 6 |
| HTL 4900 | Field Work (optional) | (6) |

Total Quarter Hours (Possible transfer credit: 9 quarter hours) **27-33**

For more information, call 617-437-2418.

Human Development Services Certificate



This certificate is designed for those who wish to acquire specialized skills to more effectively deal with a specific client group. After completing the core courses, the student is able to choose a specialized track appropriate for his/her personal and/or professional development.

| Required | | quarter hours |
|---|--|----------------------|
| <i>Choose only one:</i> | | |
| PSY 4240 | Development: Infancy and Childhood | (3) |
| PSY 4241 | Development: Adolescence | (3) |
| PSY 4242 | Development: Adulthood and Aging | (3) |
| <i>Required</i> | | |
| REC 4210 | Psycho-social Aspects of Illness and Disability | 3 |
| REC 4378 | Professional Parenting 1 | 3 |
| SPC 4150 | Self-Concept and Communication | 3 |
| SPC 4225 | Family Communication | 3 |
| SPC 4240 | Managing Interpersonal Conflict | 3 |
| <i>Choose one of the following groupings:</i> | | |
| Gerontology, Required* | | |
| HSC 4610 | Geriatric Nutrition | 3 |
| PSY 4243 | Aging and Mental Health | 3 |
| SOC 4225 | Social Gerontology | 3 |
| SOC 4235 | Death and Dying | 3 |
| Learning Disabilities, Required† | | |
| REC 4200 | Introduction to Learning Disabilities | 3 |
| REC 4250 | Assessing Learning Disabilities | 3 |
| REC 4350 | Legal Aspects of Disabilities and Rehabilitation | 3 |
| REC 4450 | Vocational Planning for the Learning Disabled | 3 |
| Infant/Child Care, Required† | | |
| REC 4105 | Childhood Medical Procedures | 2 |
| REC 4215 | Causes and Detection of Child Abuse | 3 |
| REC 4300 | Arts and Crafts | 3 |
| REC 4379 | Professional Parenting 2 | 3 |
| Adolescent Care, Required† | | |
| REC 4101 | Therapeutic Recreation 1 | 3 |
| REC 4215 | Causes and Detection of Child Abuse | 3 |
| REC 4379 | Professional Parenting 2 | 3 |
| SOC 4195 | Drugs and Society | 3 |
| Total Quarter Hours | | 29-30 |

*For more information call (617) 437-2416 or 437-2423.

†For more information call (617) 437-3843 or 437-2818.

Human Resources Management Certificate Program†



This certificate will help you develop skills to handle the changing aspects of employer/employee relations as the workplace grows increasingly complex.

| | | | | quarter hours |
|----------|----------|----------|--|---------------|
| HRM 4301 | or | HRM 4401 | Organizational Behavior | 3 |
| HRM 4302 | or | HRM 4402 | Introduction to Human Resources Management | 3 |
| HRM 4303 | or | HRM 4403 | Applied Human Resources Management | 3 |
| HRM 4310 | HRM 4311 | | Personnel Management 1, 2* | 6 |
| HRM 4330 | HRM 4331 | | Employment Rights 1, 2* | 6 |
| HRM 4340 | | | Public and Private Sector Collective Bargaining in the United States | 3 |
| HRM 4325 | | | Training and Development in Organizations | 3 |
| HRM 4900 | | | Field Work (optional) | (6) |

Total Quarter Hours (Possible transfer credit: 9 quarter hours) **27-33**

†This certificate may also be taken by students who have completed the Compensation and Benefits Management certificate.

*Courses with asterisks do not have to be repeated.

For more information, call 617-437-2418.

Law and Criminal Justice Certificate Program



This certificate is designed to give a background in the evolution and concepts of criminal law, the fundamentals of trial procedures, the rules of evidence, and the history and development of the American Constitution.

| | | | | quarter hours |
|---------|---------|--|---------------------------------|---------------|
| CJ 4101 | | | Administration of Justice | 3 |
| CJ 4108 | CJ 4109 | | Criminal Law and Procedure 1, 2 | 6 |
| CJ 4110 | | | Constitutional Law | 3 |
| CJ 4114 | CJ 4115 | | Introduction to Law 1, 2 | 6 |
| CJ 4118 | | | Juvenile Law | 3 |
| CJ 4511 | | | Survey of Criminal Evidence | 3 |

Total Quarter Hours (Possible transfer credit: 6 quarter hours) **24**

For more information, call 617-437-2425.

Management
Certificate
Program



| | | | | |
|---|----------|----------|---|---------------|
| This program offers students the opportunity to develop the managerial skills important in all areas of management. | | | | quarter hours |
| HRM 4301 | or | HRM 4401 | Organizational Behavior | 3 |
| MIS 4101 | | | Introduction to Data Processing and Information Systems 1 | 3 |
| MGT 4101 | MGT 4102 | | Introduction to Business and Management 1, 2 | (6) |
| or | | | or | |
| MGT 4105 | | | Introduction to Business and Management Intensive | (6) |
| MGT 4320 | | | Managing Change | 3 |
| MGT 4323 | | | Management and Leadership | 3 |
| MGT 4330 | | | Essentials for Managers of Small Business | 3 |
| or | | | or | |
| MGT 4329 | | | Managing Small Businesses | (3) |
| MGT 4900 | | | Field Work (optional) | (6) |
| Elective | | | | 3 |
| Total Quarter Hours | | | (Possible transfer credit: 9 quarter hours) | 24-30 |

For more information, call 617-437-2418.

Marketing
Certificate
Program



| | | | | |
|---|----|----------|---|---------------|
| This program is designed to help prepare students for a marketing career by learning to identify consumer needs, develop new products or services, determine prices, deal with customers, and develop promotional strategies. | | | | quarter hours |
| MKT 4301 | or | MKT 4401 | Introduction to Marketing 1 | 3 |
| MKT 4302 | or | MKT 4402 | Introduction to Marketing 2 | 3 |
| MKT 4310 | or | MKT 4410 | Advertising Management 1 | 3 |
| MKT 4315 | or | MKT 4415 | Sales Management 1 | 3 |
| MKT 4320 | or | MKT 4420 | Marketing Management | 3 |
| MKT 4330 | or | MKT 4430 | Marketing Research 1 | 3 |
| MKT 4307 | | | Telemarketing Management | 3 |
| MKT 4335 | | | Public Relations 1 | 3 |
| MKT 4900 | | | Field Work (optional) | (6) |
| Total Quarter Hours | | | (Possible transfer credit: 9 quarter hours) | 24-30 |

For more information, call 617-437-2418.

Microcomputer
Software
Specialist
Program



This program will be offered in the winter 1991 quarter. Please consult the Winter 1991 *Schedule Guide* or call the Business Administration Program office, at 617-437-2418 for further information.

Operations Management Certificate Program



This program allows students to learn how to help companies achieve higher profits by operating at maximum efficiency and lowest cost.

| | | | quarter hours |
|----------|----|---------|---|
| IM 4301 | or | IM 4401 | Introduction to Operations Management |
| IM 4302 | | | Operations Analysis |
| IM 4314 | | | Productivity Enhancement and Quality Management |
| IM 4317 | | | Purchasing and Materials Management |
| IM 4321 | | | Operations Planning and Control |
| IM 4326 | | | Operations Management Policy |
| IM 4900 | | | Field Work (optional) |
| MS 4332 | | | Statistical Quality Control |
| PUR 4390 | | | Just-In-Time Manufacturing (JIT) |

Total Quarter Hours (Possible transfer credit: 9 quarter hours) **24-30**

For more information, call 617-437-2418.

Policing Certificate Program



This certificate is a combination of police theory and contemporary investigative techniques.

| | | | quarter hours |
|---------|---------|--|---|
| CJ 4105 | | | Computer Applications in Criminal Justice |
| CJ 4108 | CJ 4109 | | Criminal Law and Procedure 1, 2 |
| CJ 4201 | CJ 4202 | | Criminal Investigation 1, 2 |
| CJ 4205 | CJ 4206 | | Patrol Theory and Administration 1, 2 |
| CJ 4211 | | | Police and Social Problems |
| CJ 4212 | | | Police Community Relations |
| CJ 4213 | | | Police Discretion |

Total Quarter Hours (Possible transfer credit: 9 quarter hours) **30**

For more information, call 617-437-2425.

Public Relations Certificate Program



This program emphasizes concepts and techniques of handling information, organizing activities and events, researching and communicating, and solving problems related to such groups as employees, stockholders, and consumers.

| | | | quarter hours |
|----------|----------|--|----------------------------|
| JRN 4112 | JRN 4113 | | Writing for Media 1, 2 |
| JRN 4335 | | | Public Relations Basics |
| JRN 4336 | | | Public Relations Practices |
| JRN 4337 | | | Public Relations Problems |
| JRN 4480 | | | Copyediting |
| MTH 4520 | | | Statistical Thinking |
| SPC 4153 | | | Techniques of Persuasion |

Choose one elective.

| | | | |
|----------|----|----------|---|
| JRN 4300 | | | Photojournalism |
| MGT 4101 | | | Introduction to Business and Management 1 |
| MKT 4301 | or | MKT 4401 | Introduction to Marketing 1 |
| ART 4368 | | | Graphic Design for Media |

Total Quarter Hours (Possible transfer credit: 9 quarter hours) **27**

For more information, call 617-437-2416 or 617-437-2423.

Purchasing and Materials Management Certificate Program



This program can help students improve productivity and reduce inventory through planning, acquisition, and conversion.

| | | | quarter hours |
|----------------------------|----------|---|---------------|
| ACC 4101 | ACC 4102 | Accounting Principles 1, 2 | 6 |
| MGT 4101 | | Introduction to Business and Management 1 | 3 |
| PUR 4351 | PUR 4352 | Purchasing 1, 2 | 6 |
| PUR 4357 | | Business Negotiations | 3 |
| PUR 4358 | | Materials Requirement Planning | 3 |
| PUR 4365 | | Production Activity Control | 3 |
| PUR 4370 | | Inventory Management | 3 |
| PUR 4900 | | Field Work (optional) | (6) |
| TRN 4305 | | Traffic Management | 3 |
| Total Quarter Hours | | | 30-36 |

(Possible transfer credit: 9 quarter hours)

For more information, call 617-437-2418.

Quality Management Certificate Program



This program is designed to help students enter the manufacturing and service industries. Focus is on attaining and maintaining optimum quality levels of products or services while ensuring low cost and customer satisfaction.

| | | | quarter hours |
|----------------------------|--|---|---------------|
| MS 4332 | | Statistical Quality Control | 3 |
| MS 4333 | | Management of Quality Control | 3 |
| MS 4334 | | Advanced Quality Control | 3 |
| MS 4335 | | Principles of Materials Inspection | 3 |
| MS 4336 | | Industrial Experimentation | 3 |
| MS 4337 | | Principles of Quality Assurance | 3 |
| IM 4314 | | Productivity Enhancement and Quality Management | 3 |
| IM 4317 | | Purchasing and Materials Management | 3 |
| IM 4900 | | Field Work (optional) | (6) |
| Total Quarter Hours | | | 24-30 |

Real Estate Certificate Program



This program offers a foundation in real estate and can help students prepare for the Massachusetts real estate salesperson examination. Northeastern University is the only degree-granting university in Massachusetts that offers a Real Estate Certificate as part of its educational programs.

| | | | quarter hours |
|----------------------------|---------|-------------------------------------|---------------|
| RE 4301 | RE 4302 | Real Estate Fundamentals 1, 2 | 6 |
| RE 4323 | RE 4324 | Real Estate Appraisal 1, 2 | 6 |
| RE 4327 | | Real Estate and Financial Analysis | 3 |
| RE 4328 | RE 4329 | Real Estate Financial Analysis 1, 2 | 6 |
| RE 4341 | RE 4342 | Real Estate Law 1, 2 | 6 |
| RE 4900 | | Field Work (optional) | (6) |
| Total Quarter Hours | | | 27-33 |

(Possible transfer credit: 9 quarter hours)

For more information, call 617-437-2418.

Security Administration Certificate Program



This certificate is designed to give a background in the basics of security management, security functions, and security operations.

| | | quarter hours |
|--|---|---|
| CJ 4403 | Introduction to Security | 3 |
| CJ 4405 | Current Security Problems | 3 |
| CJ 4406 | CJ 4407 | Security Administration 1, 2 |
| CJ 4408 | Legal Aspects of Security Management and Operations | 3 |
| CJ 4701 | Independent Study 1 | 3 |
| <i>Criminal justice and security electives</i> | | 6 |
| Total Quarter Hours | | (Possible transfer credit: 9 quarter hours) 24 |

For more information, call 617-437-2425.

Security Technology Certificate Program



This certificate introduces the areas of modern security technology as well as the legal, industrial and physical aspects of the security field.

| | | quarter hours |
|--|---|---|
| CJ 4403 | Introduction to Security | 3 |
| CJ 4404 | Industrial Safety and Fire Prevention | 3 |
| CJ 4408 | Legal Aspects of Security Management and Operations | 3 |
| CJ 4409 | CJ 4110 | Physical Security Methods and Technology 1, 2 |
| CJ 4411 | Electronic Information Security | 3 |
| <i>Criminal justice and security electives</i> | | 6 |
| Total Quarter Hours | | (Possible transfer credit: 9 quarter hours) 24 |

For more information, call 617-437-2425.

Small Business Management Certificate Program



This program is a thorough overview of small business operations, from drawing up a comprehensive business plan to hiring employees and keeping sound financial records.

| | | quarter hours |
|----------------------------|---------------------------|---|
| ACC 4101 | Principles of Accounting | 3 |
| MKT 4301 | or | MKT 4401 |
| MKT 4310 | or | MKT 4410 |
| BL 4101 | Advertising Management 1 | 3 |
| HRM 4301 | or | HRM 4401 |
| MGT 4328 | Organizational Behavior | 3 |
| MGT 4329 | Creating New Ventures | 3 |
| MGT 4340 | Managing Small Businesses | 3 |
| MGT 4341 | Small Business 1, 2 | 6 |
| Total Quarter Hours | | (Possible transfer credit: 9 quarter hours) 27 |

For more information call 617-437-2418.

Speech Communication Certificate Program



This program offers students the opportunity to enhance their career prospects by acquiring communications skills vital to all professional pursuits.

| | | quarter hours |
|----------------------------|---|---------------|
| SPC 4101 | Fundamentals of Human Communication | 3 |
| SPC 4102 | Group Discussion | 3 |
| SPC 4111 | Voice and Articulation | 3 |
| SPC 4150 | Self-Concept and Communication | 3 |
| SPC 4151 | Listening | 3 |
| SPC 4152 | Interviewing | 3 |
| SPC 4153 | Techniques of Persuasion | 3 |
| SPC 4154 | Negotiation Skills | 3 |
| SPC 4251 | Business and Professional Speaking | 3 |
| Total Quarter Hours | (Possible transfer credit: 9 quarter hours) | 27 |

For more information, call 617-437-2416 or 617-437-2423.

Technical Writing Certificate Program



This program is designed to help students acquire skills preparatory to careers in various technical writing fields.

| | | quarter hours |
|--------------------------------------|---|--|
| ART 4140 | Graphic Communication and Production | 3 |
| MIS 4101 | MIS 4102 | Introduction to Data Processing and Information Systems 1, 2 |
| | | 6 |
| TCC 4101 | TCC 4102 | Technical Writing 1, 2 |
| | | 6 |
| TCC 4105 | Editing for Science and Technology | 3 |
| TCC 4301 | TCC 4302 | Computer Software Technical Writing 1, 2 |
| | | 6 |
| <i>Choose one computer language.</i> | | |
| MIS 4221 | COBOL Programming 1 | (3) |
| or | or | |
| MIS 4240 | Introduction to Programming in BASIC | (3) |
| or | or | |
| MIS 4250 | FORTTRAN Programming 1 | (3) |
| or | or | |
| MIS 4270 | Pascal Programming 1 | (3) |
| Total Quarter Hours | (Possible transfer credit: 9 quarter hours) | 27 |

For more information, call 617-437-2416 or 617-437-2423.

Transportation and Physical Distribution Management Certificate Program



This program provides students with a comprehensive background in the overall operation of transportation firms, specifically rate determination, warehousing, and regulation and deregulation.

| | | | quarter hours |
|----------|----------|---|---------------|
| TRN 4301 | TRN 4303 | Elements of Transportation 1, 2 | 6 |
| TRN 4302 | TRN 4304 | Physical Distribution Management 1, 2 | 6 |
| TRN 4900 | | Field Work (optional) | (6) |
| MGT 4101 | | Introduction to Business and Management 1 | 3 |

Transportation electives 9

Total Quarter Hours (Possible transfer credit: 9 quarter hours) **24-30**

For more information, call 617-437-2418.

Ultrasonographic Studies Certificate Program



Ultrasonographic Studies is intended to aid students preparing for or just beginning a direct patient care experience in ultrasonography. Students may choose those courses that complement their particular clinical setting. Students will receive a certificate in ultrasonographic studies after successful completion of eleven courses in the ultrasound curriculum. The certificate represents that recipients have acquired a broadbase knowledge in diagnostic medical sonography.

Students that seek American Registry of Medical Diagnostic Sonographer professional registration are encouraged to contact the ARDMS at 513-721-6662 for registry eligibility requirements.

Prerequisites include: MTH 4110, 4111, BIO 4175, and 4176 or certification or licensure as a health care professional (radiographer, nurse, EMT, etc.). Interview with Program Director required prior to registering for courses. Direct patient care experience is not part of the current curriculum.

| | | quarter hours |
|----------|---|---------------|
| RAD 4130 | Ultrasound Physics and Instrumentation | 3 |
| RAD 4131 | Abdominal Ultrasound | 3 |
| RAD 4132 | Echocardiography | 3 |
| RAD 4133 | Obstetric and Gynecological Ultrasound | 3 |
| RAD 4134 | Neonatal Anatomy and Pediatric Echocardiography | 3 |
| RAD 4135 | Endosonography | 3 |
| RAD 4136 | Doppler and Small Body Parts | 2 |
| RAD 4137 | Peripheral Vascular Doppler | 2 |
| RAD 4304 | Cross Sectional Anatomy | 4 |

Choose 6 q.h. from the following electives:

| | | | |
|----------|----------|--|---|
| HMG 4100 | | Hospital Organization and Management 1 | 3 |
| HMG 4215 | | Health Law | 3 |
| HSC 4301 | HSC 4302 | Pathophysiology 1, 2 | 6 |

Total Quarter Hours **32**

**Writing
Certificate
Program**



This program allows students to investigate and practice different types of writing in order to develop the organizational and communication skills necessary for a variety of careers.

| | | quarter hours |
|----------------------------|----------|---|
| ENG 4349 | ENG 4350 | Expository and Persuasive Writing 1, 2 |
| ENG 4352 | | Expository Communications |
| JRN 4112 | | Writing for Media 1 |
| JRN 4113 | | Writing for Media 2 |
| TCC 4101 | | Technical Writing 1 |
| ENG 4356 | | Creative Writing |
| ENG 4363 | | Writing for the Marketplace |
| JRN 4522 | | Magazine Writing |
| or | or | |
| JRN 4560 | | Developing Writing Style |
| Total Quarter Hours | | (Possible transfer credit: 9 quarter hours) 27 |

For more information, call 617-437-2416 or 617-437-2423.

Intermediate and Advanced Certificate Programs

University College offers several certificate programs designed to meet the needs of students who have already completed a substantial body of college work. These programs all have specific prerequisites for entry and students should read the descriptive information provided to determine whether they are eligible.

Students wishing to enter one of these programs should file a petition with the Office of Academic and Stu-

dent Affairs. If documentation of transfer credit is important for establishing that prerequisites have been met, copies of college transcripts should be attached to the petition. Petitions are available from the Office of Academic and Student Affairs, 180 Ryder Hall, 617-437-2400, and at all campus locations.

All certificate policies stated on page 35 apply to Intermediate and Advanced Certificate Programs as well.

Activity Leader Certificate Program

See page 108 for details.

American Sign Language- English Interpreting Certificate Program



The Program

The American Sign Language-English Interpreting Certificate Program is designed to offer students education and training as sign language interpreters. Developed for students already proficient in American Sign Language and English, the nine courses in the program cover the theory and practice of interpreting. Students who are looking for entry-level staff positions or

freelance assignments may find this program helpful. Students preparing for state quality assurance screening and national evaluation may also benefit from this program.

Students must complete all required course work and maintain an overall average of 3.0 or better in the program to attain the certificate.

Admission

Candidates for admission must have received a B or better in Advanced American Sign Language Proficiency 2 (ASL 4302), or have attained equivalent skills. Prospective students must complete an application process in which

they demonstrate proficiency in English and American Sign Language as well as display an aptitude for tasks involved in the interpreting process. Previous experience in the deaf community is also highly recommended.

For More Information

For introductory program (ASL Deaf Studies Certificate), please see page 38. Applications and further information are available from the Sign Language Programs office, 276 Holmes

Hall, Northeastern University, 360 Huntington Avenue, Boston, Massachusetts 02115, 617-437-3064 (voice); or 617-437-3067 (TTY).

American Sign Language-English Interpreting Certificate Program

continued from previous page.

| | | | | quarter hours |
|----------------------------|----------|---|---|---------------|
| ASL 4600 | | | Introduction to Interpreting | 3 |
| ASL 4601 | ASL 4602 | ASL 4603 | American Sign Language Interpreting 1, 2, 3 | 12 |
| ASL 4604 | ASL 4605 | | Special Topics in Interpreting 1, 2 | 6 |
| ASL 4606 | | | Interpreter Roles and Ethics | 3 |
| ASL 4607 | | | Interpreting Lab | 4 |
| ASL 4608 | | | Practicum | 4 |
| Total Quarter Hours | | (Possible transfer credit: 8 quarter hours) | | 32 |

Advanced placement examinations are available for ASL 4202, ASL 4302, ASL 4412, and ASL 4410, which are prerequisites for courses for this certificate.

Executive Management Certificate Program



This program is designed for upper-level business students who have earned degrees already or who are majoring in areas other than management. Its intent is to provide a second dimension or specialization in management for the accounting, finance, marketing or management information systems professionals.

This program is open only to

students who have completed at least 80 quarter hours of college-level work, primarily in business subjects. As part of this 80 q.h. students must meet the prerequisites for each course as outlined in the individual course descriptions. Students enrolled in the University College BSBA Management degree are *not* eligible to receive this certificate.

Executive Management Certificate Program

| | | | | quarter hours |
|----------------------------|----------|---|---|---------------|
| MGT 4410 | | | Project Management Process: Planning and Implementation | 3 |
| MGT 4323 | | | Management and Leadership | 3 |
| MGT 4450 | MGT 4451 | | Business Policy 1, 2 | 6 |
| MGT 4455 | | | Manager and Society | 3 |
| MGT 4456 | | | International Business Management and Operations | 3 |
| MGT 4460 | MGT 4461 | | Management Seminar 1, 2 | 6 |
| MGT 4900 | | | Field Work (optional) | (6) |
| MKT 4420 | | | Marketing Management | 3 |
| Total Quarter Hours | | (Possible transfer credit: 9 quarter hours) | | 27-33 |

For more information, call 617-437-2418.

Health Record Administration Post-Baccalaureate Certificate Program



See page 99 for details.

International Business Certificate Program



This program is designed for students who have earned business degrees already or who are upper-level students currently majoring in business. Its intent is to provide a specialization in international business issues in addition to the major concentration.

This program is open only to students who have completed at least 80 q.h. of college-level work, primarily in business subjects. As part of this 80 q.h. students must meet the prerequisite for each course as outlined in the individual course descriptions.

| | | quarter hours |
|----------------------------|--|---------------|
| BL 4316 | International Law | 3 |
| ECN 4334 | Comparative Economic Systems | 3 |
| FI 4450 | International Finance | 3 |
| HRM 4345 | Comparative International Labor Relations Systems | 3 |
| MGT 4456 | International Business | 3 |
| MGT 4357 | Cultural Issues in International Business | 3 |
| MKT 4453 | International Marketing | 3 |
| TRN 4350 | International Transportation and Distribution Management | 3 |
| Total Quarter Hours | (Possible transfer credit: 9 quarter hours) | 24 |

For more information call 617-437-2418.

Special Programs

Career Transition Certificate Program



The Career Transition Certificate Program is designed to meet the needs of adult students who are preparing to re-enter the workforce or to advance in or change careers in business. The program combines academic study, field experience and professional growth seminars.

The academic component of the program is comprised of a business certificate in Accounting, Computer Programming, Finance, Marketing, or Purchasing. Also included in the academic portion of the program are a career development course and a management course. When students have completed the business certificate

and the career development course, they are eligible for field work where they may earn an additional six quarter hours of credit. An explanation of field work can be found on page 21 of the *Bulletin*.

In addition to the academic and field work components of the program, there are professional development seminars provided free of charge to students. These seminars offer tools for successful transitions.

Students who have already completed certificates in Accounting, Computer Programming, Finance, Marketing, or Purchasing are not eligible for this program.

| | quarter hours |
|---|--|
| INT 4110 | Managing Career Decisions 3 |
| Business Certificate Program: Accounting, Computer Programming, Finance, Marketing, or Purchasing | 24-30 credits |
| MGT 4323 | Management and Leadership 3 |
| ACC, MIS, MKT, PUR, or FI 4900 | Field Work 6 |
| 2 Seminars (No cost to student) | 0 |
| Total Quarter Hours | (Possible transfer credit: 9 quarter hours) 36-42 credits |

For more information call 617-437-2418.

National Institute for the Food Industry Certificate

HTL 4307 Food Service Sanitation prepares students to receive the National Institute for the Food Industry Certification.

Preparation for National Certification —APICS

The following courses are preparation for national exam certification leading to the title Certified Production and Inventory Control Manager (CPIM).

| | quarter hours |
|----------------------------|-----------------------------------|
| PUR 4358 | Materials Requirements Planning 3 |
| PUR 4365 | Production Activity Control 3 |
| PUR 4370 | Inventory Management 3 |
| PUR 4390 | Just-In-Time Manufacturing 3 |
| PUR 4395 | Master Production Scheduling 3 |
| Total Quarter Hours | 15 |

For more information, call 617-437-2418.

**Preparation
for National
Certification
—NAPM**

The following courses prepare students to take the NAPM certification exams leading to Certified Purchasing Manager (C.P.M.). These courses may be applied toward the Purchasing and Materials Management Certificate and/or the associate's degree in Purchasing.

| | | quarter hours |
|----------------------------|--------------|---------------|
| PUR 4351 | Purchasing 1 | 3 |
| PUR 4352 | Purchasing 2 | 3 |
| Total Quarter Hours | | 6 |

For more information, call 617-437-2418.

**Phlebotomy
Certification
Preparation**

This program is geared toward students who want to enter the health field as well as to currently practicing phlebotomists who want to be certified. These courses are designed to prepare students for the national certification examinations in phlebotomy. Students should speak to the Phlebotomy Clinical Coordinator prior to the start of the term to indicate their interest in the program.

| | | quarter hours |
|----------------------------|----------------------------|---------------|
| MLS 4104 | Introduction to Phlebotomy | 4 |
| MLS 4108 | Phlebotomy Applied Study | 2 |
| Total Quarter Hours | | 6 |

For more information, call the Phlebotomy Clinical Coordinator at 617-437-3664.

**Real Estate
Salesperson's
Examination**

The following courses cover the basic principles and terminology of real estate, and the practices of real estate brokerage, including appraisal, finance, development, management, and investment. Upon successful completion of these courses, students may take the Massachusetts Real Estate Salesperson's Examination.

| | | quarter hours |
|----------------------------|----------------------------|---------------|
| RE 4301 | Real Estate Fundamentals 1 | 3 |
| RE 4302 | Real Estate Fundamentals 2 | 3 |
| Total Quarter Hours | | 6 |

For more information, call 617-437-2418.

**Transition to
Higher
Education
Certificate
Program**



This certificate program was developed for people who are taking courses at the college level for the first time and who are uncertain about their academic abilities. The program is designed to help develop basic skills in math, writing, and computer literacy. It may assist you in planning a program of study, increasing your self awareness and self-esteem, and improving communications with others. Lastly, the program may help you to see how you fit into the organization in which you work.

Most students come to Northeastern University to prepare for, or to advance their careers. This program em-

phasizes skills which are essential ingredients not only for academic success but also for career mobility in today's market.

Specialized support services are available to students in this certificate program. For this reason, it is essential that you complete a certificate petition for this program prior to beginning your studies. (Petitions are available at the Boston Campus in room 180 Rugles Building and at all branch locations.) When we receive your application for the program, we will send you information containing a recommended sequence of study and support services.

Transition to Higher Education Certificate Program

continued from previous page.

| | | quarter hours |
|--|-------------------------------------|---------------|
| INT 4110 | Managing Career Decisions | 3 |
| ED 4050 | College Reading and Study Skills | 3 |
| ENG 4011 | Elements of Writing | 3 |
| ENG 4012 | Elements of Grammar | 3 |
| MTH 4001 | Introduction to Mathematics | 3 |
| PSY 4242 | Development: Adulthood and Aging | 3 |
| HRM 4301 | Organizational Behavior | 3 |
| COM 4101 | Computer Literacy | 4 |
| <i>Choose one communications course:</i> | | |
| SPC 4101 | Fundamentals of Human Communication | (3) |
| SPC 4150 | Self-Concept and Communication | (3) |
| SPC 4155 | Organizational Communication | (3) |
| Total Quarter Hours | | 28 |

A Basic Program For Emergency Medical Technician

This course is designed for those who wish to become certified EMTs as well as for those who just want to be prepared for emergencies. Students who successfully complete the course receive nine quarter hours of credit, a Northeastern University certificate, and a CPR certification from the American Heart Association. They

also become eligible to take the state EMT licensing examination.

The EMT Basic course is offered at the Boston, Burlington, and Dedham campuses. Students spend 6 hours in class weekly for 12 weeks, 4 all-day Saturday exercises and 10 hours of in-hospital emergency room observation. There is a special tuition rate.

| | | quarter hours |
|----------------------------|------------|---------------|
| EMS 4107 | EMT Basics | 9 |
| Total Quarter Hours | | 9 |

For more information call 617-272-5500.

Business Administration and Technology Degree Programs

Martha P. Welch, *Assistant Dean,
Director, Business Administration
Programs*

Rose A. Doherty, *Assistant Director,
Business Administration Programs*
270 Ryder Hall
617-437-2418

Program Consultants

ACC: Accounting

Consultant:
Professor Paul A. Janell (College of
Business Administration)
(617-437-4645)

*Associate Consultant (Accounting
Principles):*
Dean Walter E. Kearney, Jr. (College of
Business Administration)
(617-437-2312)

BL: Business Law

Consultant:
Thomas J. Ahern, Esq. (617-426-4211)

FI: Finance

Consultant:
Professor Jonathan Welch (College of
Business Administration)
(617-437-4572)
Associate Consultant:
Joseph Stanford (617-383-9299)

HTL: Hotel and Restaurant Management

Consultant:
Donald A. Witkoski (508-362-2131,
x361)

HRM: Human Resources Management

Consultant:
Professor Brendan Bannister (College
of Business Administration)
(617-437-2503)
Associate Consultant:
Ronald E. Guittarr (508-475-4422)

IM: Industrial Management

Consultants:
Professor Robert A. Parsons (College of
Business Administration)
(617-437-4749)
Joel M. Rosenfeld (617-491-9200)
Associate Consultant:
James D. Mukjian (617-451-4004)

INT: Career/College Transition

Consultant:
Kathleen H. Hayes (617-437-4261)

MGT: Management

Consultant:
Professor Daniel McCarthy (College of
Business Administration)
(617-437-3255)

Associate Consultants:

W. Arthur Gagne (508-263-5819)
Robert L. Goldberg (617-437-4737)

MIS: Management Information Systems

Consultant:
Professor Victor Godin (College of
Business Administration)
(617-437-2418)

Associate Consultant (Systems):
James F. Ferreira (617-969-3100)

Associate Consultant (EDP):
Thomas M. Kelly (617-468-7900)
Associate Consultants (Programming):
Andrew E. Efstathiou (617-727-6524)
Bennett L. Kramer (508-588-9100,
x208)

*Associate Consultant (Computer
Systems Specialist Programs)*
Alan M. Tattle (617-595-3696)

MKT: Marketing

Consultant:
Professor Dan T. Dunn, Jr. (College of
Business Administration)
(617-437-4563)

Associate Consultant:
William T. Hadley (617-266-8400)

MS: Quality Control and Management Sciences

Consultant:
Professor Robert A. Parsons (College of
Business Administration)
(617-437-4749)
Associate Consultant:
William E. Grady (617-721-5770)

PUR: Purchasing

Consultant:
Stephen F. Armstrong (508-281-2000,
x2519)

RE: Real Estate

Consultant:
Peter Flynn (617-233-2284)

TRN: Transportation and Physical Distribution Management

Consultant:
Professor James F. Molloy (College of
Business Administration)
(617-437-4812)

A Wide Variety of Options: Certificates and Degrees

Northeastern University in its part-time degree programs strives to prepare graduates who can adapt readily, perform immediately, and manage effectively.

Northeastern offers a wide and exciting selection of part-time undergraduate courses, certificates, and associate degrees. These can lead to five bachelor of science in business administration degrees or two bachelor of science in industrial technology degrees.

The degree programs are designed for men and women preparing for managerial responsibility in business, government, and other organizations. Students are challenged to think independently, support ideas with fact and logic, and develop a comprehensive

understanding of the realities of business decision-making.

Upon completion of the Bachelor of Science in Business Administration degree, the graduate may also choose to go on to pursue higher degrees not only in business but also in public administration, health-care administration, educational administration, and law. While the Association of American Law Schools does not recommend a particular curriculum for prelegal students, it does advise undergraduates to develop critical understanding of the institution and values with which the law deals. Many careers in law are directly involved in the business world, either in large corporations or in private practice.

Certificates in Business

Individuals can pursue a certificate program to build on or prepare for a new career, to qualify for a promotion, to stay current in a chosen field, or simply to acquire new skills and

knowledge. Some individuals enroll in a certificate program as part of their traditional degree program. University College offers certificates in the following program areas:

Business Administration

- Accounting (page 37)
- Business Administration (page 39)
- Career Transition (page 57)
- Compensation and Benefits Management (page 40)
- Computer Certificates
 - Computer Programming and Systems Analysis (page 40)
 - Computer Systems Specialist Program (page 41)
 - Microcomputer Software Specialist (page 47)
- Culinary Arts (Chef's Institute) (page 42)
- Executive Management (page 55)
- Finance (page 43)
- Food Service Management (page 43)
- International Business (page 56)
- Hotel and Restaurant Management (page 44)
- Human Resources Management (page 46)
- Management (page 47)
- Marketing (page 47)
- Purchasing and Materials Management (page 49)
- Quality Management (page 49)
- Real Estate (page 49)
- Small Business (page 50)
- Transition to Higher Education (page 58)
- Transportation and Physical Distribution Management (page 52)

Operations Technology

- Electronic Composition (page 43)
- Operations Management (page 48)
- Quality Management (page 49)

Preparation for Certification (CPIM and C.P.M.)

Clusters of courses are being offered to prepare students for the national examinations leading to the titles of Certified Production and Inventory Con-

trol Manager (CPIM) and Certified Purchasing Manager (C.P.M.). See pages 57-58 for details.

National Institute for the Food Industry Certificate

HTL 4307 Food Service Sanitation provides an opportunity for certification from the National Institute for the Food Industry.

Real Estate Salesperson's Examination

Individuals interested in preparing for the Massachusetts Real Estate

Salesperson's Examination may take the courses detailed on page 58.

Career Transition Program

If you are interested in re-entering the job market or changing careers,

consider the Career Transition Program, detailed on page 57.

Transition to Higher Education Certificate Program

If you are thinking of taking courses at the college level for the first time but are insecure about your academic abilities, consider this program.

Developing basic skills in math, writing, and computer literacy may assist you in planning a rewarding and successful academic career.

Degree Programs

Associate in Science Degrees (AS)

Through a core of professional business courses and a well-balanced sequence of liberal arts courses, students in the Associate in Science degree program acquire specialized knowledge for future managerial growth.

To receive the associate's degree, a student must successfully complete the 96 quarter hours of course credit specified for the degree. Students who have completed a certificate program may then enroll in an associate's degree program. (Although credits earned in a certificate program may be

applied toward this degree, completion of a certificate program is not required.)

Students who wish to earn one of the Associate in Science degrees in business and who have not earned 80 quarter hours of credit are required to enroll in the Open Business courses listed on page 65. Open Business courses include a required component that may be used for course validation in the Bachelor of Science in Business Administration (BSBA) degree programs.

Associate's degrees are offered in the following areas:

Business Administration

- Accounting (page 67)
- Business Administration (page 68)
- Finance (page 69)
- Hotel and Restaurant Management (page 70)
- Human Resources Management (page 70)

- Management Information Systems (page 71)
- Marketing (page 72)
- Purchasing and Materials Management (page 73)
- Real Estate (page 74)
- Transportation and Physical Distribution (page 74)

Operations Technology

- Operations Management (page 73)

**Bachelor of
Science in
Business
Administration:
BSBA Degree**

University College offers a Bachelor of Science in Business Administration degree with course concentrations in these areas:

- Accounting
- Finance
- Management Information Systems
- Management
- Marketing

The Bachelor of Science in Business Administration degree programs of University College are designed for men and women seeking to prepare themselves for managerial responsibility in business, government, and other organizations with the goal of developing the ability to recognize and solve problems and to understand the role of the business firm in the community, the nation, and the world. In developing these skills, students have the opportunity to gain not only a broad understanding of business and organizational problems through specialized courses, but also first-hand

knowledge from effective teaching practitioners.

To ensure a well-rounded background that is so valuable in the business world, the college combines its business curriculum with courses from the sciences, humanities, and social sciences.

After the course-work foundation is completed, (See "Planning Your Program of Study Toward a Bachelor of Science in Business Administration Degree," p. 64) the various functional areas of business are emphasized and students concentrate their studies in specific areas. (Detailed descriptions of these areas follow this section.) In most of these upper-level courses, the traditional lecture-and-recitation format is supplemented by problem-solving and case-study methods where students analyze actual businesses and business problems and present recommendations for possible solutions.

**Accreditation
by the
American
Assembly of
Collegiate
Schools of
Business**

University College's Bachelor of Science in Business Administration Degree is fully accredited by the American Assembly of Collegiate Schools of Business, indicating that the programs meet the accrediting agency's standards for faculty and student quality, curriculum design, and overall University support.

**Operations
Technology
Bachelor of
Science
Degrees (BS)**

B.S. degrees are offered in:

- Electronic Publishing Technology (page 79)
- Operations Technology (page 78)

The technology programs are designed to prepare the student to meet the

challenge of interfacing technology and society. The technology student not only learns related disciplines but also becomes oriented in disciplines to which his or her technological skills will be applied.

**Opportunities
for Associate's
Degree
Graduates**

Graduates of science, engineering technology, liberal arts, or other selected programs in Northeastern University, community colleges, or other similar colleges and institutions

who have an associate degree or equivalent may transfer applicable credits toward the degree requirements of the baccalaureate programs in operations technology.

**Special
Studies**

University College offers a variety of Special Studies. These courses give students an opportunity to earn credits in Advanced Tutorials, Independent

Studies, Honors Programs, and Field Work. Consult course descriptions on pages 130-246.

Planning Your Program of Study Toward a Bachelor of Science in Business Administration Degree

Students who plan to work toward the Bachelor of Science in Business Administration Degree should submit transcripts of previously completed college-level course work and a Transfer Credit Petition to the Office of Academic and Student Affairs. (Transfer Credit Petitions may be requested by calling 617-437-2400. Petitions are also available at all campus locations.) Students will receive by mail a transfer credit evaluation and a suggested plan of study to prepare for admission to this program. When this paperwork has been completed, students are encouraged to schedule an appointment to discuss their programs with an academic advisor.

Students who do not have any academic courses that may be transferred from another educational institution or program should meet with an academic advisor early in their studies at University College. These students are required to complete 80 quarter

hours of credit, including English courses ENG 4110, ENG 4111, and ENG 4112; mathematics courses MTH 4110 and MTH 4111; and a social science elective from the course list that follows. This course work must be completed prior to admission to the BSBA degree program.

Once students have met these requirements, they should complete a Petition for Admission to the Bachelor of Science in Business Administration Degree program and return it to the Office of Academic and Student Affairs to initiate the admissions process. This petition may be obtained at all campus locations or by calling 617-437-2400.

Admission to the BSBA Degree program is restricted to students who have maintained a 2.0 cumulative grade-point average and completed a minimum of 80 quarter hours of credit.

Students should choose their 80 quarter hours of credit from the course list that follows.

Recommended Lower-Level Courses

| | | | |
|----------------|----------|----------|--|
| ACC 4101 | ACC 4102 | ACC 4103 | Accounting Principles 1, 2, 3 |
| BL 4101 | BL 4102 | | Law 1, 2 |
| ECN 4115 | ECN 4116 | ECN 4117 | Economic Principles and Problems 1, 2, 3 |
| ECN 4250 | ECN 4251 | | Statistics 1, 2 |
| ENG 4110 | ENG 4111 | | Critical Writing 1, 2 |
| ENG 4112 | | | Approaches to Literature |
| ENG 4380 | ENG 4381 | | Business Writing and Reports 1, 2 |
| HST 4101 | | | The Civilization of the Ancient and Medieval Worlds |
| HST 4102 | | | The Civilization of the Early Modern World |
| or HST 4103 | | | or The Civilization of the Modern World |
| MGT 4101 | MGT 4102 | MGT 4103 | Introduction to Business and Management 1, 2, 3 |
| MIS 4101 | MIS 4102 | | Introduction to Data Processing and Information Systems 1, 2 |
| MS 4325 | | | Business Decision Models |
| MTH 4110 | MTH 4111 | | Math 1, 2 |
| PHL 4100 | | | Philosophical Thinking |
| PSY 4110 | | | Introduction to Psychology: Fundamental Issues |
| PSY 4111 | | | Introduction to Psychology: Developmental Aspects |
| or PSY 4112 | | | or Introduction to Psychology: Personal Dynamics |
| SOC 4100 | | | Roles, Culture, and the Individual |

continued on next page

| | |
|---|-------------------------------------|
| SOC 4101 | Inequality and Institutions |
| or | or |
| SOC 4102 | Institutions and Social Change |
| SPC 4101 | Fundamentals of Human Communication |
| 3 quarter hours of a natural science elective | |

Special Requirements for BSBA Degree Programs

Northeastern University is unique in the New England region in that both its full-time and part-time bachelor's degree business programs are accredited by the American Assembly of

Collegiate Schools of Business (AACSB).

The following procedures assure that University College's BSBA programs conform to AACSB standards.

1. Reserved and Open Courses

Business courses in the BSBA programs are classified as *reserved* and *open*. Reserved courses are upper-level, and some are mandatory for students who have enrolled in the BSBA degree program. To be qualified to register for a reserved course, the student must have earned a total of 80 or more

credits (including transfer credits). Reserved courses are offered at the Boston, Burlington, Dedham, Framingham, and Weymouth campuses. A student may register for an open course anytime, providing he or she has fulfilled the prerequisites.

2. Validation

Validation is the term used to describe procedures that test whether an open course completed at the lower division of a bachelor's program should be accepted for transfer credit in the upper division of an AACSB-approved bachelor's degree program. There are three approved validation methods:

- **Sequential Course.** Students who enroll in a Bachelor of Science in Business Administration Degree program can validate a course taken at University College or elsewhere by successfully completing a course that is sequential to the course already completed. The sequential course must be taken in a reserved section. For example, successful completion of *Cost Accounting 2*

in a reserved course can validate *Cost Accounting 1*, regardless of where the student completed *Cost Accounting 1*.

- **College-Level Examination Program (CLEP) and/or Proficiency Examination Program (PEP).** These standard examinations can be used to validate some previously taken upper-level business courses.

- **Departmental Examination.** In cases where a sequential course does not exist or is not desired by a student, and no appropriate CLEP or PEP examination exists, validation can be accomplished through a departmental examination.

Required upper-level courses are listed as follows under Reserved and Open Sections.

OPEN BUSINESS COURSES

Open business courses are available on an open enrollment basis as long as the stated prerequisites are met and the student has earned under 80 quarter hours of credit. Open business courses are used to fulfill associate

degree requirements. Candidates for the BSBA degree should enroll in reserved business courses; however, validated open business courses are transferable into the BSBA degree program.

| | | | |
|----------|----------|----------|---------------------------------|
| ACC 4301 | ACC 4302 | ACC 4307 | Intermediate Accounting 1, 2, 3 |
| ACC 4310 | | | Cost Accounting 1 |
| FI 4301 | | | Principles of Finance |
| FI 4302 | | | Financial Management |

continued on next page

| | | |
|----------|----------|--|
| FI 4310 | | Investment Principles |
| FI 4320 | | Credit Principles |
| FI 4325 | | Budgeting and Planning |
| HRM 4301 | | Organizational Behavior |
| HRM 4302 | | Introduction to Human Resources Management |
| HRM 4303 | | Applied Human Resources Management |
| HRM 4304 | | Organizational Behavior and Introduction to Human Resources Management (Intensive) |
| IM 4301 | | Introduction to Operations Management |
| MGT 4346 | | International Business Management and Operations |
| MGT 4355 | | Manager and Society |
| MIS 4301 | MIS 4302 | Structured Systems Analysis and Design 1, 2 |
| MIS 4305 | | Structured Systems Analysis and Design (Intensive) |
| MIS 4307 | | Communications and Networking |
| MKT 4301 | | Introduction to Marketing 1 |
| MKT 4302 | | Introduction to Marketing 2 |
| MKT 4310 | | Advertising Management 1 |
| MKT 4315 | | Sales Management 1 |
| MKT 4320 | | Marketing Management |
| MKT 4330 | | Marketing Research 1 |

RESERVED BUSINESS COURSES

The courses below are offered for students in the Bachelor of Science degree programs and for those

students who have earned 80 quarter hours of credit. Please note appropriate course prerequisites.

| | | | |
|----------|----------|----------|--|
| ACC 4400 | | | Accounting Information Systems |
| ACC 4401 | ACC 4402 | ACC 4407 | Intermediate Accounting 1, 2, 3 |
| ACC 4408 | | | Intermediate Accounting 4 |
| ACC 4410 | | | Cost Accounting 1 |
| ACC 4411 | | | Cost Accounting 2 |
| ACC 4425 | ACC 4426 | | Auditing 1, Auditing 2 |
| ACC 4440 | ACC 4441 | | Federal Income Taxes 1, 2 |
| FI 4401 | | | Principles of Finance |
| FI 4402 | | | Financial Management |
| FI 4403 | | | Financial Strategy |
| FI 4410 | | | Investment Principles |
| FI 4411 | | | Investment Management |
| FI 4420 | | | Credit Principles |
| FI 4421 | | | Credit Management |
| FI 4425 | | | Budgeting and Planning |
| FI 4426 | | | Financial Control |
| FI 4450 | | | International Finance |
| HRM 4401 | | | Organizational Behavior |
| HRM 4402 | | | Introduction to Human Resources Management |
| HRM 4403 | | | Applied Human Resources Management |
| HRM 4404 | | | Organizational Behavior and Introduction to Human Resources Management (Intensive) |

continued on next page

| | | |
|----------|----------|---|
| IM 4401 | | Introduction to Operations Management |
| MGT 4410 | | Project Management Process: Planning and Implementation |
| MGT 4446 | | International Business Management and Operations |
| MGT 4450 | MGT 4451 | Business Policy 1, 2 |
| MGT 4452 | | Business Policy (Intensive) |
| MGT 4455 | | Manager and Society |
| MGT 4460 | MGT 4461 | Management Seminar 1, 2 |
| MGT 4463 | | Management Seminar Intensive |
| MIS 4401 | MIS 4402 | Structured Systems Analysis and Design 1, 2 |
| MIS 4405 | | Structured Systems Analysis and Design (Intensive) |
| MIS 4407 | | Communications and Networking |
| MIS 4445 | | Database Management Systems |
| MIS 4448 | | Information Resource Management |
| MIS 4485 | | Applied MIS Development Project |
| MKT 4401 | MKT 4402 | Introduction to Marketing 1, 2 |
| MKT 4404 | | Introduction to Marketing (Intensive) |
| MKT 4410 | MKT 4411 | Advertising Management 1, 2 |
| MKT 4412 | | Advertising Management (Intensive) |
| MKT 4415 | MKT 4416 | Sales Management 1, 2 |
| MKT 4417 | | Sales Management (Intensive) |
| MKT 4420 | | Marketing Management |
| MKT 4430 | MKT 4431 | Marketing Research 1, 2 |
| MKT 4453 | | International Marketing |
| MKT 4457 | | Competitive Strategy |

**Accounting
Associate in
Science
Degree
(Major
Code 470)**



See also: Accounting Bachelor of Science in Business Administration Degree, page 76.

**Core Courses
Liberal Arts**

quarter hours

| | | | |
|----------|----------|--|--|
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | 6 |
| ENG 4112 | | Approaches to Literature | 3 |
| MTH 4110 | MTH 4111 | Math 1, 2 | 6 |
| ECN 4250 | ECN 4251 | Statistics 1, 2 | 6 |
| ECN 4115 | ECN 4116 | ECN 4117 | Economic Principles and Problems 1, 2, 3 |
| PSY 4110 | | Introduction to Psychology: Fundamental Issues | 3 |
| PSY 4111 | | Introduction to Psychology: Developmental Aspects | (3) |
| or | | or | |
| PSY 4112 | | Introduction to Psychology: Personal Dynamics | (3) |

Business Administration

| | | | |
|----------|----------|---|---|
| BL 4101 | BL 4102 | Law 1, 2 | 6 |
| FI 4301 | | Principles of Finance | 3 |
| HRM 4301 | | Organizational Behavior | 3 |
| HRM 4302 | | Introduction to Human Resources Management | 3 |
| MGT 4101 | MGT 4102 | Introduction to Business and Management 1, 2 | 6 |

continued on next page

| | | | | |
|-----------------------------|----------|--|---------------------------------|----|
| MIS 4101 | MIS 4102 | Introduction to Data Processing and Information Systems 1, 2 | | 6 |
| MKT 4301 | | Introduction to Marketing 1 | | 3 |
| MS 4325 | | Business Decision Models | | 3 |
| Major Concentration Courses | | | | |
| ACC 4101 | ACC 4102 | ACC 4103 | Accounting Principles 1, 2, 3 | 9 |
| ACC 4301 | ACC 4302 | ACC 4307 | Intermediate Accounting 1, 2, 3 | 9 |
| ACC 4310 | | | Cost Accounting 1 | 3 |
| Nonbusiness electives | | | | 6 |
| Total Quarter Hours | | | | 96 |

**Business
Administration
Associate in
Science
Degree (Major
Code 401)**



See also Management Bachelor of Science in Business Administration Degree, page 80.

Core Courses

| Liberal Arts | | | quarter hours |
|--------------|----------|--|--|
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | 6 |
| ENG 4112 | | Approaches to Literature | 3 |
| MTH 4110 | MTH 4111 | Math 1, 2 | 6 |
| ECN 4250 | ECN 4251 | Statistics 1, 2 | 6 |
| ECN 4115 | ECN 4116 | ECN 4117 | Economic Principles and Problems 1,2,3 |
| PSY 4110 | | Introduction to Psychology: Fundamental Issues | 3 |
| PSY 4111 | | Introduction to Psychology: Developmental Aspects | (3) |
| or | | or | |
| PSY 4112 | | Introduction to Psychology: Personal Dynamics | (3) |

Business Administration

| | | | | |
|----------|----------|----------|---|---|
| ACC 4101 | ACC 4102 | ACC 4103 | Accounting Principles 1, 2, 3 | 9 |
| FI 4301 | | | Principles of Finance | 3 |
| HRM 4301 | | | Organizational Behavior | 3 |
| HRM 4302 | | | Introduction to Human Resources Management | 3 |
| HRM 4303 | | | Applied Human Resources Management | 3 |
| MIS 4101 | MIS 4102 | | Introduction to Data Processing and Information Systems 1, 2 | 6 |
| MKT 4301 | | | Introduction to Marketing 1 | 3 |
| MS 4325 | | | Business Decision Models | 3 |

Major Concentration Courses

| | | | | |
|----------|----------|----------|---|---|
| MGT 4101 | MGT 4102 | MGT 4103 | Introduction to Business and Management 1, 2, 3 | 9 |
| MGT 4346 | | | International Business Management and Operations | 3 |
| MGT 4355 | | | Manager and Society | 3 |

Electives

| | | | | |
|----------------------------|--|--|--|-----------|
| Nonbusiness electives | | | | 6 |
| Open electives | | | | 6 |
| Total Quarter Hours | | | | 96 |

**Finance
Associate in
Science
Degree
(Major Code
476)**



See also: Finance Bachelor of Science in Business Administration Degree, page 77.

| Core Courses | | | | quarter hours |
|---|----------|----------|--|----------------------|
| Liberal Arts | | | | |
| ENG 4110 | ENG 4111 | | Critical Writing 1, 2 | 6 |
| ENG 4112 | | | Approaches to Literature | 3 |
| MTH 4110 | MTH 4111 | | Math 1, 2 | 6 |
| ECN 4250 | ECN 4251 | | Statistics 1, 2 | 6 |
| ECN 4115 | ECN 4116 | ECN 4117 | Economic Principles and Problems 1,2,3 | 9 |
| PSY 4110 | | | Introduction to Psychology: Fundamental Issues | 3 |
| PSY 4111 | | | Introduction to Psychology: Developmental Aspects | (3) |
| or | | | or | |
| PSY 4112 | | | Introduction to Psychology: Personal Dynamics | (3) |
| Business Administration | | | | |
| ACC 4101 | ACC 4102 | ACC 4103 | Accounting Principles 1, 2, 3 | 9 |
| BL 4101 | BL 4102 | | Law 1, 2 | 6 |
| HRM 4301 | | | Organizational Behavior | 3 |
| HRM 4302 | | | Introduction to Human Resources Management | 3 |
| MGT 4101 | MGT 4102 | | Introduction to Business and Management 1, 2 | 6 |
| MIS 4101 | MIS 4102 | | Introduction to Data Processing and Information Systems 1, 2 | 6 |
| MKT 4301 | | | Introduction to Marketing 1 | 3 |
| MS 4325 | | | Business Decision Models | 3 |
| <i>Choose one computer programming course from:</i> | | | | |
| MIS 4221 | | | COBOL Programming 1 | (3) |
| or | | | or | |
| MIS 4241 | | | Programming in BASIC 1 | (3) |
| or | | | or | |
| MIS 4250 | | | FORTTRAN Programming 1 | (3) |
| Major Concentration Courses | | | | |
| FI 4301 | | | Principles of Finance | 3 |
| FI 4302 | | | Financial Management | 3 |
| FI 4310 | | | Investment Principles | 3 |
| FI 4320 | | | Credit Principles | 3 |
| FI 4325 | | | Budgeting and Planning | 3 |
| Electives | | | | 3 |
| Total Quarter Hours | | | | 96 |

**Hotel and
Restaurant
Management
Associate in
Science
Degree
(Major
Code 472)**



**Core Courses
Liberal Arts**

| | | | quarter hours |
|----------|----------|---|---------------|
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | 6 |
| ENG 4112 | | Approaches to Literature | 3 |
| MTH 4110 | MTH 4111 | Math 1, 2 | 6 |
| SPC 4101 | | Fundamentals of Human Communication | 3 |
| ECN 4115 | | Economic Principles and Problems 1 | 3 |
| PSY 4110 | | Introduction to Psychology: Fundamental Issues | 3 |
| PSY 4111 | | Introduction to Psychology: Developmental Aspects | (3) |
| or | | or | |
| PSY 4112 | | Introduction to Psychology: Personal Dynamics | (3) |

Business Administration

| | | | |
|----------|----------|---|---|
| ACC 4101 | | Accounting Principles 1 | 3 |
| HRM 4301 | | Organizational Behavior | 3 |
| HRM 4302 | | Introduction to Human Resources Management | 3 |
| HRM 4303 | | Applied Human Resources Management | 3 |
| MGT 4101 | MGT 4102 | Introduction to Business and Management 1, 2 | 6 |
| MIS 4101 | | Introduction to Data Processing and Information Systems 1 | 3 |

Major Concentration Courses

| | | | |
|----------|--|--|---|
| HTL 4301 | | Introduction to Hotel and Restaurant Management | 3 |
| HTL 4303 | | Front Office Management | 3 |
| HTL 4304 | | Hotel and Restaurant Law | 3 |
| HTL 4307 | | Food Service Sanitation | 3 |
| HTL 4308 | | Food and Beverage Cost Control | 3 |
| HTL 4309 | | Managerial Accounting for the Hospitality Industry | 3 |
| HTL 4313 | | Introduction to Tourism | 3 |
| HTL 4320 | | Food Preparation Intensive | 6 |
| HTL 4322 | | Consumer Food Preparation | 3 |
| HTL 4324 | | Dining Room Beverage Operation and Preparation | 3 |
| HTL 4331 | | Professional Chef's Training | 6 |

Electives

| | |
|----------------------------|-----------|
| Total Quarter Hours | 96 |
|----------------------------|-----------|

**Human
Resources
Management
Associate in
Science
Degree
(Major
Code 477)**



**Core Courses
Liberal Arts**

| | | | quarter hours |
|----------|----------|--|--|
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | 6 |
| ENG 4112 | | Approaches to Literature | 3 |
| MTH 4110 | MTH 4111 | Math 1, 2 | 6 |
| ECN 4250 | ECN 4251 | Statistics 1, 2 | 6 |
| ECN 4115 | ECN 4116 | ECN 4117 | Economic Principles and Problems 1,2,3 9 |
| PSY 4110 | | Introduction to Psychology: Fundamental Issues | 3 |

continued on next page

| | | | |
|---|----------|--|-----------|
| PSY 4111 | | Introduction to Psychology: Developmental Aspects | (3) |
| or | | | |
| PSY 4112 | | Introduction to Psychology: Personal Dynamics | (3) |
| Business Administration | | | |
| ACC 4101 | ACC 4102 | Accounting Principles 1, 2 | 6 |
| BL 4101 | | Law 1 | 3 |
| FI 4301 | | Principles of Finance | 3 |
| MGT 4101 | MGT 4102 | Introduction to Business and Management 1, 2 | 6 |
| MIS 4101 | MIS 4102 | Introduction to Data Processing and Information Systems 1, 2 | 6 |
| MKT 4301 | | Introduction to Marketing 1 | 3 |
| MS 4325 | | Business Decision Models | 3 |
| <i>Choose one computer programming course from:</i> | | | |
| MIS 4221 | | COBOL Programming 1 | (3) |
| or | | | |
| MIS 4241 | | Programming in BASIC 1 | (3) |
| or | | | |
| MIS 4250 | | FORTRAN Programming 1 | (3) |
| Major Concentration Courses | | | |
| HRM 4301 | | Organizational Behavior | 3 |
| HRM 4302 | | Introduction to Human Resources Management | 3 |
| HRM 4303 | | Applied Human Resources Management | 3 |
| HRM 4310 | HRM 4311 | Personnel Management 1, 2 | 6 |
| HRM 4330 | HRM 4331 | Employment Rights 1, 2 | 6 |
| HRM 4340 | | Public and Private Sector Collective Bargaining | 3 |
| Nonbusiness electives | | | 3 |
| Total Quarter Hours | | | 96 |

**Management
Information
Systems
Associate in
Science
Degree
(Major
Code 475)**



See also: Management Information Systems Bachelor of Science in Business Administration, page 81.

| | | | | |
|--------------------------------|----------|----------|--|----------------------|
| Core Courses | | | | |
| Liberal Arts | | | | quarter hours |
| ENG 4110 | ENG 4111 | | Critical Writing 1, 2 | 6 |
| ENG 4112 | | | Approaches to Literature | 3 |
| MTH 4110 | MTH 4111 | | Math 1, 2 | 6 |
| ECN 4250 | ECN 4251 | | Statistics 1, 2 | 6 |
| ECN 4115 | ECN 4116 | ECN 4117 | Economic Principles and Problems 1,2,3 | 9 |
| SPC 4101 | | | Fundamentals of Human Communication | 3 |
| Business Administration | | | | |
| ACC 4101 | ACC 4102 | | Accounting Principles 1, 2 | 6 |
| FI 4301 | | | Principles of Finance | 3 |
| HRM 4301 | | | Organizational Behavior | 3 |
| HRM 4302 | | | Introduction to Human Resources Management | 3 |
| HRM 4303 | | | Applied Human Resources Management | 3 |
| IM 4301 | | | Operations Management | 3 |
| MGT 4101 | MGT 4102 | | Introduction to Business and Management 1, 2 | 6 |

continued on next page

| | | | |
|------------------------------------|----------|--|-----------|
| MS 4325 | | Business Decision Models | 3 |
| Major Concentration Courses | | | |
| MIS 4101 | MIS 4102 | Introduction to Data Processing and Information Systems 1, 2 | 6 |
| MIS 4221 | MIS 4222 | COBOL Programming 1, 2 | 6 |
| MIS 4230 | | PC Software for Professionals | (3) |
| or | | or | |
| MIS 4236 | | Advanced PC Software | (3) |
| MIS 4301 | MIS 4302 | Structured Systems Analysis and Design 1, 2 | 6 |
| MIS 4307 | | Communications and Networking | 3 |
| Electives | | | 9 |
| Total Quarter Hours | | | 96 |

**Marketing
Associate in
Science
Degree
(Major
Code 479)**



See also: Marketing Bachelor of Science in Business Degree, page 83.

Core Courses

| Liberal Arts | | | quarter hours |
|---------------------|----------|-------------------------------------|--|
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | 6 |
| ENG 4112 | | Approaches to Literature | 3 |
| MTH 4110 | MTH 4111 | Math 1, 2 | 6 |
| ECN 4250 | ECN 4251 | Statistics 1, 2 | 6 |
| ECN 4115 | ECN 4116 | ECN 4117 | Economic Principles and Problems 1, 2, 3 |
| ENG 4380 | | Business Writing and Reports 1 | 3 |
| SPC 4101 | | Fundamentals of Human Communication | 3 |

Business Administration

| | | | |
|----------|----------|--|---|
| ACC 4101 | ACC 4102 | Accounting Principles 1, 2 | 6 |
| FI 4301 | | Principles of Finance | 3 |
| HRM 4301 | | Organizational Behavior | 3 |
| HRM 4302 | | Introduction to Human Resources Management | 3 |
| MGT 4101 | MGT 4102 | Introduction to Business and Management 1, 2 | 6 |
| MIS 4101 | MIS 4102 | Introduction to Data Processing and Information Systems 1, 2 | 6 |
| MS 4325 | | Business Decision Models | 3 |

Major Concentration Courses

| | | | |
|----------|----------|--------------------------------|---|
| MKT 4301 | MKT 4302 | Introduction to Marketing 1, 2 | 6 |
| MKT 4307 | | Telemarketing Management | 3 |
| MKT 4310 | | Advertising Management 1 | 3 |
| MKT 4315 | | Sales Management 1 | 3 |
| MKT 4320 | | Marketing Management | 3 |
| MKT 4330 | | Marketing Research 1 | 3 |
| MKT 4335 | | Public Relations 1 | 3 |

| | | | |
|------------------------------|--|--|-----------|
| Nonbusiness electives | | | 6 |
| Total Quarter Hours | | | 96 |

**Operations
Management
Associate in
Science
Degree
(Major
Code 478)**



(formerly Industrial Management Associate in Science Degree)

| Core Courses | | | |
|--|----------|--------------------------|--|
| Liberal Arts | | | quarter hours |
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | 6 |
| ENG 4112 | | Approaches to Literature | 3 |
| MTH 4110 | MTH 4111 | Math 1, 2 | 6 |
| ECN 4250 | ECN 4251 | Statistics 1, 2 | 6 |
| ECN 4115 | ECN 4116 | ECN 4117 | Economic Principles and Problems 1, 2, 3 |
| MTH 4130 | MTH 4131 | | Calculus for Nonengineers 1, 2 |
| PSY 4110 | | | Introduction to Psychology: Fundamental Issues |
| PSY 4111 | | | Introduction to Psychology: Developmental Aspects |
| or | | or | |
| PSY 4112 | | | Introduction to Psychology: Personal Dynamics |
| Business Administration | | | |
| ACC 4101 | ACC 4102 | | Accounting Principles 1, 2 |
| FI 4301 | | | Principles of Finance |
| MGT 4101 | MGT 4102 | | Introduction to Business and Management 1, 2 |
| MIS 4101 | MIS 4102 | | Introduction to Data Processing and Information Systems 1, 2 |
| MKT 4301 | | | Introduction to Marketing 1 |
| MS 4325 | | | Business Decision Models |
| Choose one computer programming course from: | | | |
| MIS 4221 | | | COBOL Programming 1 |
| or | | or | |
| MIS 4241 | | | Programming in BASIC 1 |
| or | | or | |
| MIS 4250 | | | FORTRAN Programming 1 |
| Major Concentration Courses | | | |
| HRM 4301 | | | Organizational Behavior |
| HRM 4302 | | | Introduction to Human Resources Management |
| HRM 4303 | | | Applied Human Resources Management |
| HRM 4310 | HRM 4311 | | Personnel Management 1, 2 |
| HRM 4330 | HRM 4331 | | Employment Rights 1, 2 |
| HRM 4340 | | | Public and Private Sector Collective Bargaining |
| Nonbusiness electives | | | |
| Total Quarter Hours | | | 96 |

**Purchasing
and Materials
Management
Associate in
Science
Degree
(Major
Code 431)**



| Core Courses | | | | quarter hours |
|-------------------------|----------|----------|--|---------------|
| Liberal Arts | | | | |
| ENG 4110 | ENG 4111 | | Critical Writing 1, 2 | 6 |
| ENG 4112 | | | Approaches to Literature | 3 |
| MTH 4110 | MTH 4111 | | Math 1, 2 | 6 |
| ECN 4250 | ECN 4251 | | Statistics 1, 2 | 6 |
| ECN 4115 | ECN 4116 | ECN 4117 | Economic Principles and Problems 1,2,3 | 9 |
| Business Administration | | | | |
| ACC 4101 | ACC 4102 | | Accounting Principles 1, 2 | 6 |
| HRM 4301 | | | Organizational Behavior | 3 |

continued on next page

| | | | |
|------------------------------------|----------|--|-----------|
| HRM 4302 | | Introduction to Human Resources Management | 3 |
| IM 4301 | | Introduction to Operations Management | 3 |
| MGT 4101 | MGT 4102 | Introduction to Business and Management 1, 2 | 6 |
| MIS 4101 | MIS 4102 | Introduction to Data Processing and Information Systems 1, 2 | 6 |
| MKT 4301 | | Introduction to Marketing 1 | 3 |
| MS 4325 | | Business Decision Models | 3 |
| Major Concentration Courses | | | |
| PUR 4351 | PUR 4352 | Purchasing 1, 2 | 6 |
| PUR 4357 | | Business Negotiations | 3 |
| PUR 4358 | | Materials Requirements Planning | 3 |
| PUR 4365 | | Production Activity Control | 3 |
| PUR 4370 | | Inventory Management | 3 |
| TRN 4305 | | Traffic Management | 3 |
| Nonbusiness electives | | | 12 |
| Total Quarter Hours | | | 96 |

**Real Estate
Associate in
Science
Degree
(Major
Code 471)**



| | | | | |
|------------------------------------|----------|--|--|----------------------|
| Core Courses | | | | quarter hours |
| Liberal Arts | | | | |
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | | 6 |
| ENG 4112 | | Approaches to Literature | | 3 |
| MTH 4110 | MTH 4111 | Math 1, 2 | | 6 |
| ECN 4250 | ECN 4251 | Statistics 1, 2 | | 6 |
| ECN 4115 | ECN 4116 | ECN 4117 | Economic Principles and Problems 1,2,3 | 9 |
| Business Administration | | | | |
| MGT 4101 | MGT 4102 | Introduction to Business and Management 1, 2 | | 6 |
| ACC 4101 | ACC 4102 | Accounting Principles 1, 2 | | 6 |
| FI 4301 | | Principles of Finance | | 3 |
| HRM 4301 | | Organizational Behavior | | 3 |
| HRM 4302 | | Introduction to Human Resources Management | | 3 |
| Major Concentration Courses | | | | |
| RE 4301 | RE 4302 | Real Estate Fundamentals 1, 2 | | 6 |
| RE 4323 | RE 4324 | Real Estate Appraisal 1, 2 | | 6 |
| RE 4328 | RE 4329 | Real Estate Financial Analysis 1, 2 | | 6 |
| RE 4341 | RE 4342 | Real Estate Law 1, 2 | | 6 |
| RE 4327 | | Real Estate and Financial Analysis | | 3 |
| Nonbusiness electives | | | | 18 |
| Total Quarter Hours | | | | 96 |

**Transportation
and Physical
Distribution
Management
Associate in
Science
Degree (Major
Code 483)**



| | | | | |
|---------------------|----------|--------------------------|--|----------------------|
| Core Courses | | | | quarter hours |
| Liberal Arts | | | | |
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | | 6 |
| ENG 4112 | | Approaches to Literature | | 3 |
| MTH 4110 | MTH 4111 | Math 1, 2 | | 6 |
| ECN 4250 | ECN 4251 | Statistics 1, 2 | | 6 |
| ECN 4115 | ECN 4116 | ECN 4117 | Economic Principles and Problems 1,2,3 | 9 |

continued on next page

| | | | |
|------------------------------------|----------|--|-----------|
| Business Administration | | | |
| ACC 4101 | ACC 4102 | Accounting Principles 1, 2 | 6 |
| FI 4301 | | Principles of Finance | 3 |
| HRM 4301 | | Organizational Behavior | 3 |
| HRM 4302 | | Introduction to Human Resources Management | 3 |
| IM 4301 | | Introduction to Operations Management | 3 |
| MGT 4101 | MGT 4102 | Introduction to Business and Management 1, 2 | 6 |
| MKT 4301 | | Introduction to Marketing 1 | 3 |
| MS 4325 | | Business Decision Models | 3 |
| Major Concentration Courses | | | |
| TRN 4301 | TRN 4303 | Elements of Transportation 1, 2 | 6 |
| TRN 4302 | TRN 4304 | Physical Distribution Management 1, 2 | 6 |
| Transportation electives | | | 6 |
| Nonbusiness electives | | | 18 |
| Total Quarter Hours | | | 96 |

Bachelor of Science in Business Administration Degrees

Accounting
Bachelor of
Science in
Business
Administration
Degree
(Major
Code 460)



See also: Accounting Associate in Science Degree, page 67.

| Liberal Arts | | | | quarter hours |
|--|----------|----------|--|---------------|
| ENG 4110 | ENG 4111 | | Critical Writing 1, 2 | 6 |
| ENG 4112 | | | Approaches to Literature | 3 |
| MTH 4110 | MTH 4111 | | Math 1, 2 | 6 |
| ECN 4115 | ECN 4116 | ECN 4117 | Economic Principles and Problems 1, 2, 3 | 9 |
| ECN 4250 | ECN 4251 | | Statistics 1, 2 | 6 |
| PSY 4110 | | | Introduction to Psychology: Fundamental Issues | 3 |
| PSY 4111 | | | Introduction to Psychology: Developmental Aspects | (3) |
| or | | | or | |
| PSY 4112 | | | Introduction to Psychology: Personal Dynamics | (3) |
| ENG 4380 | ENG 4381 | | Business Writing and Reports 1, 2 | 6 |
| SOC 4100 | | | Roles, Culture, and the Individual | 3 |
| SOC 4101 | | | Inequality and Institutions | (3) |
| or | | | or | |
| SOC 4102 | | | Institutions and Social Roles | (3) |
| SPC 4101 | | | Fundamentals of Human Communication | 3 |
| HST 4101 | | | The Civilization of the Ancient and Medieval Worlds | 3 |
| HST 4102 | | | The Civilization of the Early Modern World | (3) |
| or | | | or | |
| HST 4103 | | | The Civilization of the Modern World | (3) |
| PHL 4100 | | | Philosophical Thinking | 3 |
| Business Administration | | | | |
| ACC 4101 | ACC 4102 | ACC 4103 | Accounting Principles 1, 2, 3 | 9 |
| BL 4101 | BL 4102 | | Law 1, 2 | 6 |
| MGT 4101 | MGT 4102 | | Introduction to Business and Management 1, 2 | 6 |
| MIS 4101 | MIS 4102 | | Introduction to Data Processing and Information Systems 1, 2 | 6 |
| MS 4325 | | | Business Decision Models | 3 |
| FI 4401 | or | FI 4301 | Principles of Finance | 3 |
| HRM 4401 | or | HRM 4301 | Organizational Behavior | 3 |
| HRM 4402 | or | HRM 4302 | Introduction to Human Resources Management | 3 |
| MKT 4401 | or | MKT 4301 | Introduction to Marketing 1 | 3 |
| FI 4402 | or | FI 4302 | Financial Management | 3 |
| IM 4401 | or | IM 4301 | Introduction to Operations Management | 3 |
| MGT 4446 | or | MTH 4346 | International Business Management and Operations | 3 |
| MGT 4450 | MGT 4451 | | Business Policy 1, 2 | 6 |
| Choose one computer programming course from: | | | | |
| MIS 4221 | | | COBOL Programming 1 | (3) |
| or | | | or | |
| MIS 4241 | | | Programming in BASIC 1 | (3) |
| or | | | or | |
| MIS 4250 | | | FORTRAN Programming 1 | (3) |
| Major Concentration Courses | | | | |
| ACC 4401 | ACC 4402 | ACC 4407 | Intermediate Accounting 1, 2, 3* | 9 |
| ACC 4404** | or | ACC 4408 | Intermediate Accounting 4 | 3 |

continued on next page

| | | | | |
|----------|----------|----------|--------------------------------|---|
| ACC 4410 | or | ACC 4310 | Cost Accounting 1 | 3 |
| ACC 4411 | | | Cost Accounting 2 | 3 |
| ACC 4425 | ACC 4426 | | Auditing 1, 2 | 6 |
| ACC 4440 | ACC 4441 | | Federal Income Taxes 1, 2 | 6 |
| ACC 4400 | | | Accounting Information Systems | 3 |

*or ACC 4301, ACC 4302, and ACC 4307.

**Students who have taken ACC 4403 must take ACC 4404.

Electives

| | |
|---|------------|
| Natural science elective (BIO, CHM, or ESC) | 3 |
| Open electives | 18 |
| Total Quarter Hours | 174 |

Finance Bachelor of Science in Business Administration Degree (Major Code 433)

See also: Finance Associate in Science Degree, page 69.

| Liberal Arts | | | quarter hours | |
|-------------------------|----------|--------------------------|--|-----|
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | 6 | |
| ENG 4112 | | Approaches to Literature | 3 | |
| MTH 4110 | MTH 4111 | Math 1, 2 | 6 | |
| ECN 4115 | ECN 4116 | ECN 4117 | Economic Principles and Problems 1, 2, 3 | 9 |
| ECN 4250 | ECN 4251 | | Statistics 1, 2 | 6 |
| PSY 4110 | | | Introduction to Psychology: Fundamental Issues | 3 |
| PSY 4111 | | | Introduction to Psychology: Developmental Aspects | (3) |
| or | | or | | |
| PSY 4112 | | | Introduction to Psychology: Personal Dynamics | (3) |
| ENG 4380 | ENG 4381 | | Business Writing and Reports 1, 2 | 6 |
| SOC 4100 | | | Roles, Culture, and the Individual | 3 |
| SOC 4101 | | | Inequality and Institutions | (3) |
| or | | or | | |
| SOC 4102 | | | Institutions and Social Change | (3) |
| SPC 4101 | | | Fundamentals of Human Communication | 3 |
| HST 4101 | | | The Civilization of the Ancient and Medieval Worlds | 3 |
| HST 4102 | | | The Civilization of the Early Modern World | (3) |
| or | | or | | |
| HST 4103 | | | The Civilization of the Modern World | (3) |
| PHL 4100 | | | Philosophical Thinking | 3 |
| Business Administration | | | | |
| MGT 4101 | MGT 4102 | | Introduction to Business and Management 1, 2 | 6 |
| ACC 4101 | ACC 4102 | ACC 4103 | Accounting Principles 1, 2, 3 | 9 |
| BL 4101 | BL 4102 | | Law 1, 2 | 6 |
| MS 4325 | | | Business Decision Models | 3 |
| MIS 4101 | MIS 4102 | | Introduction to Data Processing and Information Systems 1, 2 | 6 |
| HRM 4401 | or | HRM 4301 | Organizational Behavior | 3 |
| HRM 4402 | or | HRM 4302 | Introduction to Human Resources Management | 3 |
| MKT 4401 | or | MKT 4301 | Introduction to Marketing 1 | 3 |
| IM 4401 | or | IM 4301 | Operations Management | 3 |

continued on next page

| | | | | |
|---|----------|----------|--|------------|
| MGT 4446 | or | MGT 4346 | International Business Management and Operations | 3 |
| MGT 4450 | MGT 4451 | | Business Policy 1, 2 | 6 |
| <i>Choose one computer programming course from:</i> | | | | |
| MIS 4221 | | | COBOL Programming 1 | (3) |
| or | | | or | |
| MIS 4241 | | | Programming in BASIC 1 | (3) |
| or | | | or | |
| MIS 4250 | | | FORTRAN Programming 1 | (3) |
| Major Concentration Courses | | | | |
| FI 4401 | or | FI 4301 | Principles of Finance | 3 |
| FI 4402 | or | FI 4302 | Financial Management | 3 |
| FI 4403 | | | Financial Strategy | 3 |
| FI 4410 | or | FI 4310 | Investment Principles | 3 |
| FI 4411 | | | Investment Management | 3 |
| FI 4420 | or | FI 4320 | Credit Principles | 3 |
| FI 4421 | | | Credit Management | 3 |
| FI 4425 | or | FI 4325 | Budgeting and Planning | 3 |
| FI 4426 | | | Financial Control | 3 |
| FI 4450 | | | International Finance | 3 |
| Electives | | | | |
| Natural science elective (BIO, CHM, or ESC) | | | | 3 |
| Open electives | | | | 27 |
| Total Quarter Hours | | | | 174 |

**Operations
Technology
Bachelor of
Science
Degree (Major
Code 492)
Operations
Technology
Concentration**



(formerly Industrial Technology Bachelor of Science Degree)

**Science, Engineering Technology,
Liberal Arts or other Elected Courses**

quarter hours

(Must also include English courses ENG 4110, 4111, 4112, or equivalent, and MTH 4110 and MTH 4111)

96

Liberal Arts

| | | | | |
|----------|----------|----------|---|-----|
| ECN 4115 | ECN 4116 | ECN 4117 | Economic Principles and Problems 1, 2, 3 | 9 |
| PSY 4110 | | | Introduction to Psychology: Fundamental Issues | 3 |
| PSY 4111 | | | Introduction to Psychology: Developmental Aspects | (3) |
| or | | | or | |
| PSY 4112 | | | Introduction to Psychology: Personal Dynamics | (3) |
| SOC 4100 | | | Roles, Culture, and the Individual | 3 |
| SOC 4101 | | | Inequality and Institutions | (3) |
| or | | | or | |
| SOC 4102 | | | Institutions and Social Change | (3) |

Business Administration

| | | | | |
|----------|----------|----------|---|---|
| MGT 4101 | | | Introduction to Business and Management 1 | 3 |
| ACC 4101 | ACC 4102 | | Accounting Principles 1, 2 | 6 |
| BL 4101 | BL 4102 | | Law 1, 2 | 6 |
| HRM 4401 | or | HRM 4301 | Organizational Behavior | 3 |
| MIS 4101 | | | Introduction to Data Processing and Information Systems 1 | 3 |
| MKT 4301 | or | MKT 4401 | Introduction to Marketing 1 | 3 |
| MS 4332 | | | Statistical Quality Control | 3 |

continued on next page

Major Concentration Courses

| | | | | |
|------------------------------|----|---------|---|------------|
| IM 4301 | or | IM 4401 | Introduction to Operations Management | 3 |
| IM 4302 | | | Operations Analysis | 3 |
| IM 4314 | | | Productivity Enhancement and Quality Management | 3 |
| IM 4317 | | | Purchasing and Materials Management | 3 |
| IM 4321 | | | Operations Planning and Control | 3 |
| IM 4326 | | | Operations Management Policy | 3 |
| Nonbusiness electives | | | | 12 |
| Total Quarter Hours | | | | 174 |

Operations Technology Bachelor of Science Degree Electronic Publishing Technology Concentration



(formerly Industrial Technology Bachelor of Science Degree)

| Liberal Arts | | | | quarter hours |
|--------------------------------|----------|----------|--|----------------------|
| ENG 4110 | ENG 4111 | | Critical Writing 1, 2 | 6 |
| ENG 4112 | | | Approaches to Literature | 3 |
| ECN 4115 | ECN 4116 | ECN 4117 | Economic Principles and Problems 1, 2, 3 | 9 |
| PSY 4110 | | | Introduction to Psychology: Fundamental Issues | 3 |
| PSY 4111 | | | Introduction to Psychology: Developmental Aspects | (3) |
| or | | | or | |
| PSY 4112 | | | Introduction to Psychology: Personal Dynamics | (3) |
| SOC 4100 | | | Roles, Culture, and the Individual | 3 |
| SOC 4101 | | | Inequality and Institutions | (3) |
| or | | | or | |
| SOC 4102 | | | Institutions and Social Change | (3) |
| Business Administration | | | | |
| ACC 4101 | ACC 4102 | | Accounting Principles 1, 2 | 6 |
| BL 4101 | BL 4102 | | Law 1, 2 | 6 |
| HRM 4301 | or | HRM 4401 | Organizational Behavior | 3 |
| MGT 4101 | | | Introduction to Business and Management 1 | 3 |
| MIS 4101 | MIS 4102 | | Introduction to Data Processing and Information Systems 1, 2 | 6 |
| MKT 4301 | or | MKT 4401 | Introduction to Marketing 1 | 3 |
| MS 4325 | | | Business Decision Models | 3 |
| Technology Courses | | | | |
| TCC 4101 | | | Technical Writing 1 | 3 |
| ECN 4250 | ECN 4251 | | Statistics 1, 2 | 6 |
| MIS 4301 | MIS 4302 | | Structured Systems Analysis and Design 1, 2 | 6 |
| IM 4301 | or | IM 4401 | Introduction to Operations Management | 3 |
| IM 4317 | | | Purchasing and Materials Management | 3 |
| IM 4321 | | | Operations Planning and Control | 3 |
| MTH 4110 | MTH 4111 | | Math 1, 2 | 6 |
| ART 4471 | | | Quality Control in the Graphic Arts Industry | 3 |
| ART 4469 | | | Operations Analysis for the Graphic Arts Industry | 3 |
| ART 4475 | | | Graphic Arts Production Control | 3 |
| ART 4479 | | | Estimating Procedures for Graphic Arts | 3 |

continued on next page

| | | |
|----------|--|---|
| ART 4461 | Applications of Electronic Publishing and Printing | 3 |
| ART 4443 | Imaging Procedures and Systems 1* | 3 |
| ART 4431 | Graphic Composition Systems 1* | 3 |
| ART 4410 | Electronic Imaging Systems | 3 |
| ART 4416 | Style Set-up for Electronic Document Production* | 3 |

Major Concentration Courses

| | | |
|----------|--|---|
| ART 4140 | Graphic Communication and Production | 3 |
| ART 4115 | Graphic Design for Non-Majors* | 3 |
| ART 4139 | Color Theory and Practice | 3 |
| ART 4151 | Typography | 3 |
| ART 4181 | Introduction to Computer-Aided Graphic Design* | 3 |
| ART 4415 | Electronic Document Production | 3 |
| ART 4366 | Promotional and Technical Publications Design and Production | 3 |

Nonbusiness electives 36

Total Quarter Hours 174

*Studio Courses

Management Bachelor of Science in Business Administration Degree (Major Code 463)



See also: Business Administration Associate in Science Degree, page 68.

| Liberal Arts | | | | quarter hours |
|-------------------------|----------|----------|---|---------------|
| ENG 4110 | ENG 4111 | | Critical Writing 1, 2 | 6 |
| ENG 4112 | | | Approaches to Literature | 3 |
| ENG 4380 | ENG 4381 | | Business Writing and Reports 1, 2 | 6 |
| ECN 4250 | ECN 4251 | | Statistics 1, 2 | 6 |
| ECN 4115 | ECN 4116 | ECN 4117 | Economic Principles and Problems 1,2,3 | 9 |
| MTH 4110 | MTH 4111 | | Math 1, 2 | 6 |
| PSY 4110 | | | Introduction to Psychology: Fundamental Issues | 3 |
| PSY 4111 | | | Introduction to Psychology: Developmental Aspects | (3) |
| or | | | or | |
| PSY 4112 | | | Introduction to Psychology: Personal Dynamics | (3) |
| SOC 4100 | | | Roles, Culture, and the Individual | 3 |
| SOC 4101 | | | Inequality and Institutions | (3) |
| or | | | or | |
| SOC 4102 | | | Institutions and Social Change | (3) |
| SPC 4101 | | | Fundamentals of Human Communication | 3 |
| HST 4101 | | | The Civilization of the Ancient and Medieval Worlds | 3 |
| HST 4102 | | | The Civilization of the Early Modern World | (3) |
| or | | | or | |
| HST 4103 | | | The Civilization of the Modern World | (3) |
| PHL 4100 | | | Philosophical Thinking | 3 |
| Business Administration | | | | |
| ACC 4101 | ACC 4102 | ACC 4103 | Accounting Principles 1, 2, 3 | 9 |
| BL 4101 | BL 4102 | | Law 1, 2 | 6 |
| FI 4401 | or | FI 4301 | Principles of Finance | 3 |
| FI 4402 | or | FI 4302 | Financial Management | 3 |
| HRM 4401 | or | HRM 4301 | Organizational Behavior | 3 |

continued on next page

| | | | | |
|---|----------|----------|--|------------|
| HRM 4402 | or | HRM 4302 | Introduction to Human Resources Management | 3 |
| HRM 4403 | or | HRM 4303 | Applied Human Resources Management | 3 |
| IM 4401 | or | IM 4301 | Introduction to Operations Management | 3 |
| MGT 4101 | MGT 4102 | MGT 4103 | Introduction to Business and Management 1, 2, 3 | 9 |
| MIS 4101 | MIS 4102 | | Introduction to Data Processing and Information Systems 1, 2 | 6 |
| MKT 4401 | or | MKT 4301 | Introduction to Marketing 1 | 3 |
| MS 4325 | | | Business Decision Models | 3 |
| <i>Choose one computer programming course from:</i> | | | | |
| MIS 4221 | | | COBOL Programming 1 | (3) |
| or | | | or | |
| MIS 4241 | | | Programming in BASIC 1 | (3) |
| or | | | or | |
| MIS 4250 | | | FORTTRAN Programming 1 | (3) |
| Major Concentration Courses | | | | |
| MGT 4410 | | | Project Management Process: Planning and Implementation | 3 |
| MGT 4446 | or | MGT 4346 | International Business Management and Operations | 3 |
| MGT 4450 | MGT 4451 | | Business Policy 1, 2 | 6 |
| MGT 4455 | or | MGT 4355 | Manager and Society | 3 |
| MGT 4460 | MGT 4461 | | Management Seminar 1, 2 | 6 |
| MKT 4420 | or | MKT 4320 | Marketing Management 1 | 3 |
| Electives | | | | |
| Natural science elective (BIO, CHM, or ESC) | | | | 3 |
| Open electives | | | | 30 |
| Total Quarter Hours | | | | 174 |

**Management
Information
Systems
Bachelor of
Science in
Business
Administration
Degree (Major
Code 465)**



See also: Management Information Systems Associate in Science Degree, page 71.

| Liberal Arts | | | quarter hours |
|---------------------|----------|---|--|
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | 6 |
| ENG 4112 | | Approaches to Literature | 3 |
| ECN 4250 | ECN 4251 | Statistics 1, 2 | 6 |
| ECN 4115 | ECN 4116 | ECN 4117 | Economic Principles and Problems 1,2,3 9 |
| MTH 4110 | MTH 4111 | Math 1, 2 | 6 |
| PSY 4110 | | Introduction to Psychology: Fundamental Issues | 3 |
| PSY 4111 | | Introduction to Psychology: Developmental Aspects | (3) |
| or | | or | |
| PSY 4112 | | Introduction to Psychology: Personal Dynamics | (3) |
| ENG 4380 | ENG 4381 | Business Writing and Reports 1, 2 | 6 |
| SOC 4100 | | Roles, Culture, and the Individual | 3 |
| SOC 4101 | | Inequality and Institutions | (3) |
| or | | or | |
| SOC 4102 | | Institutions and Social Change | (3) |
| SPC 4101 | | Fundamentals of Human Communication | 3 |
| HST 4101 | | The Civilization of the Ancient and Medieval Worlds | 3 |

continued on next page

| | | | | |
|---|----------|----------|--|------------|
| HST 4102 | | | The Civilization of the Early Modern World | (3) |
| or | | | or | |
| HST 4103 | | | The Civilization of the Modern World | (3) |
| PHL 4100 | | | Philosophical Thinking | 3 |
| Business Administration | | | | |
| ACC 4101 | ACC 4102 | ACC 4103 | Accounting Principles 1, 2, 3 | 9 |
| BL 4101 | BL 4102 | | Law 1, 2 | 6 |
| FI 4401 | or | FI 4301 | Principles of Finance | 3 |
| FI 4402 | or | FI 4302 | Financial Management | 3 |
| HRM 4401 | or | HRM 4301 | Organizational Behavior | 3 |
| HRM 4402 | or | HRM 4302 | Introduction to Human Resources Management | 3 |
| HRM 4403 | or | HRM 4303 | Applied Human Resources Management | 3 |
| IM 4401 | or | IM 4301 | Introduction to Operations Management | 3 |
| MGT 4101 | MGT 4102 | | Introduction to Business and Management 1, 2 | 6 |
| MGT 4446 | or | MGT 4346 | International Business Management and Operations | 3 |
| MGT 4450 | MGT 4451 | | Business Policy 1, 2 | 6 |
| MIS 4101 | MIS 4102 | | Introduction to Data Processing and Information Systems 1, 2 | 6 |
| MIS 4221 | MIS 4222 | | COBOL Programming 1, 2 | 6 |
| MIS 4230 | | | PC Software for Professionals | (3) |
| or | | | or | |
| MIS 4236 | | | Advanced PC Software | (3) |
| MKT 4401 | or | MKT 4301 | Introduction to Marketing 1 | 3 |
| MS 4325 | | | Business Decision Models | 3 |
| Major Concentration Courses | | | | |
| MGT 4410 | | | Project Management Process: Planning and Implementation | 3 |
| MIS 4401 | MIS 4402 | | Structured Systems Analysis and Design 1, 2* | 6 |
| MIS 4407 | or | MIS 4307 | Communications and Networking | 3 |
| MIS 4445 | | | Database Management Systems | 3 |
| MIS 4448 | | | Information Resource Management | 3 |
| MIS 4485 | | | Applied MIS Development Project | 3 |
| *MIS 4301 and MIS 4302. | | | | |
| Electives | | | | |
| Natural science elective (BIO, CHM, or ESC) | | | | 3 |
| Open electives | | | | 21 |
| Total Quarter Hours | | | | 174 |

Tracks in Modern Information Systems

There are two rather different "tracks" in modern information systems. Both provide opportunities for exciting and challenging careers.

The Large Systems Track is concerned with the systems analysis and development methodologies traditionally associated with the large transaction processing and management reporting systems that form the backbone of an organization's information system.

The End-User Computing Track is concerned with the emerging area of microcomputer-based management decision and support systems.

In addition to the required courses listed above, we recommend that students choose one of the two tracks and select some or all of the following courses as electives:

**Large Track
System**MIS 4280
MIS 4281
MIS 4350Computer Operating Systems 1
Computer Operating Systems 2
Auditing Data Processing**End User
Computing Track**

MIS 4236

Advanced PC Software (if not already
taken)

MIS 4241 MIS 4242

Programming in BASIC 1 and 2

MIS 4273

PC DOS and Assembly

MIS 4276 MIS 4277

Programming in C 1 and 2

**Marketing
Bachelor of
Science in
Business
Administration
Degree (Major
Code 461)**

See also: Marketing Associate in Science degree, page 72.

Liberal Arts**quarter hours**

| | | | | |
|----------|----------|---|--|---|
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | 6 | |
| ENG 4112 | | Approaches to Literature | 3 | |
| ENG 4380 | ENG 4381 | Business Writing and Reports 1, 2 | 6 | |
| ECN 4250 | ECN 4251 | Statistics 1, 2 | 6 | |
| ECN 4115 | ECN 4116 | ECN 4117 | Economic Principles and Problems 1,2,3 | 9 |
| HST 4101 | | The Civilization of the Ancient and Medieval Worlds | 3 | |
| HST 4102 | | The Civilization of the Early Modern World | (3) | |
| or | | or | | |
| HST 4103 | | The Civilization of the Modern World | (3) | |
| MTH 4110 | MTH 4111 | Math 1, 2 | 6 | |
| PHL 4100 | | Philosophical Thinking | 3 | |
| PSY 4110 | | Introduction to Psychology: Fundamental Issues | 3 | |
| PSY 4111 | | Introduction to Psychology: Developmental Aspects | (3) | |
| or | | or | | |
| PSY 4112 | | Introduction to Psychology: Personal Dynamics | (3) | |
| SOC 4100 | | Roles, Culture, and the Individual | 3 | |
| SOC 4101 | | Inequality and Institutions | (3) | |
| or | | or | | |
| SOC 4102 | | Institutions and Social Change | (3) | |
| SPC 4101 | | Fundamentals of Human Communications | 3 | |

Business Administration

| | | | | |
|----------|----------|----------|---|---|
| ACC 4101 | ACC 4102 | ACC 4103 | Accounting Principles 1, 2, 3 | 9 |
| BL 4101 | BL 4102 | | Law 1, 2 | 6 |
| FI 4401 | or | FI 4301 | Principles of Finance | 3 |
| FI 4402 | or | FI 4302 | Financial Management | 3 |
| HRM 4401 | or | HRM 4301 | Organizational Behavior | 3 |
| HRM 4402 | or | HRM 4302 | Introduction to Human Resources Management | 3 |
| IM 4401 | or | IM 4301 | Introduction to Operations Management | 3 |
| MGT 4101 | MGT 4102 | | Introduction to Business and Management 1, 2 | 6 |
| MGT 4446 | or | MGT 4346 | International Business Management and Operations | 3 |
| MGT 4450 | MGT 4451 | | Business Policy 1, 2 | 6 |
| MIS 4101 | MIS 4102 | | Introduction to Data Processing and Information Systems 1, 2 | 6 |
| MS 4325 | | | Business Decision Models | 3 |

continued on next page

Choose one computer programming course from:

| | | | |
|----------|--|------------------------|-----|
| MIS 4221 | | COBOL Programming 1 | (3) |
| or | | or | |
| MIS 4241 | | Programming in BASIC 1 | (3) |
| or | | or | |
| MIS 4250 | | FORTTRAN Programming 1 | (3) |

Major Concentration Courses

| | | | | |
|----------|----|----------|-----------------------------|---|
| MKT 4401 | or | MKT 4301 | Introduction to Marketing 1 | 3 |
| MKT 4402 | or | MKT 4302 | Introduction to Marketing 2 | 3 |
| MKT 4420 | or | MKT 4320 | Marketing Management | 3 |
| MKT 4410 | or | MKT 4310 | Advertising Management 1 | 3 |
| MKT 4411 | | | Advertising Management 2 | 3 |
| MKT 4415 | or | MKT 4315 | Sales Management 1 | 3 |
| MKT 4416 | | | Sales Management 2 | 3 |
| MKT 4430 | or | MKT 4330 | Marketing Research 1 | 3 |
| MKT 4431 | | | Marketing Research 2 | 3 |
| MKT 4453 | | | International Marketing | 3 |
| MKT 4457 | | | Competitive Strategy | 3 |

Electives

| | |
|---|----|
| Natural science elective (BIO, CHM, or ESC) | 3 |
| Open electives | 18 |
| Nonbusiness elective | 3 |

| | |
|----------------------------|------------|
| Total Quarter Hours | 174 |
|----------------------------|------------|

Criminal Justice and Security Degree Programs

Richard J. Comings, *Assistant Dean
Acting Director, Criminal Justice and
Security Programs*
290 Ryder Hall
617-437-2425

Program Consultants

Corrections/Criminology and Research
Prof. Edith E. Flynn
College of Criminal Justice
617-437-2394

Law
Prof. Frank A. Schubert
College of Criminal Justice
617-437-3349

Policing
Prof. George L. Kelling
College of Criminal Justice
617-437-4532

Security
Prof. Norman Bates
College of Criminal Justice
617-437-3367

Purpose

Criminal Justice and Security programs are designed to provide a professional focus to students with a broadly based undergraduate education, to ensure that program graduates are prepared to enter or advance in careers in criminal justice or security ad-

ministration or to enroll in graduate or professional schools.
Requirements for each program are outlined on the following pages. Upon petition, students may be permitted to substitute other courses that will more adequately serve their specific objectives.

Bachelor of Science Degree Programs

Programs leading to the Bachelor of Science degree are offered in corrections, policing, and security. Students should choose their major in consultation with a program advisor.
Each curriculum provides for not less than 174 quarter hours of work, in-

cluding at least 75 quarter hours of advanced work in a major field.
Transfer students must complete at least 45 quarter hours of academic work at University College immediately preceding graduation in order to be eligible for a degree.

Associate in Science Degree Programs

Programs leading to the associate's degree are offered for those who wish to obtain a general background in corrections, policing, or security and who may later wish to pursue a bachelor's degree.
Candidates for the associate in

science degree must complete a minimum of ninety-six quarter hours of credit. This is approximately one half of the requirements for the bachelor of science degree and includes at least forty-eight quarter hours of work in a major field.

Certificate Programs

Students who seek specialized skills to advance their careers may choose a certificate program, which they may

take independently or in conjunction with degree study.

Course Sequence

Upon completion of the courses required for admission, the student should elect courses from the core and major concentration areas to fulfill the requirements for the associate in science and the bachelor of science degrees.
Degree requirements may be completed at the student's own pace. A

total of thirty-two courses is required for an associate in science degree, which can be completed in as few as three years, or nine academic quarters. A bachelor of science degree can be completed over a period of five years, or fifteen academic quarters. This schedule averages out to four courses per academic quarter.

Distribution Requirements

In order to satisfy the distribution requirements in any criminal justice and security program, students should first discuss their programs with an academic advisor.

English courses ENG 4110, ENG 4111, and ENG 4112 (nine quarter

hours) must be taken before admission to a degree program. The remaining required courses, amounting to 33 to 36 quarter hours, should be taken from the core and major concentration courses as listed on the following pages.

Special Studies

U.C. offers a variety of Special Studies. These courses give students an opportunity to earn credits in Advanced

Tutorials, Independent Studies, Honors Programs, and Field Work. Consult descriptions on pages 20-21.

Corrections Associate in Science Degree (Major Code 949)



| Core Courses | | quarter hours |
|---|----------|--|
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 6 |
| ENG 4112 | | Approaches to Literature 3 |
| HST 4202 | | American History 1848-1917 3 |
| POL 4104 | | Introduction to American Government 3 |
| PSY 4110 | | Introduction to Psychology: Fundamental Issues 3 |
| SOC 4100 | | Roles, Culture, and the Individual 3 |
| SOC 4186 | | Social Control 3 |
| CJ 4101 | | Administration of Criminal Justice 3 |
| CJ 4102 | | Crime Prevention and Security 3 |
| CJ 4103 | | Criminology 3 |
| CJ 4104 | | Dimensions of Crime 3 |
| CJ 4105 | | Computer Applications in Criminal Justice 3 |
| CJ 4108 | CJ 4109 | Criminal Law and Procedure 1, 2 6 |
| CJ 4110 | | Constitutional Law 3 |
| Major Concentration Courses | | |
| CJ 4301 | | American Correctional System 3 |
| CJ 4302 | CJ 4303 | Correctional Administration 1, 2 6 |
| CJ 4304 | | Jail Administration and Management 3 |
| CJ 4305 | | Case Management and Correctional Services 3 |
| CJ 4306 | | Correctional Security Methods and Technology 3 |
| CJ 4307 | | The Rights of Offenders and Prisoners 3 |
| CJ 4308 | | Correctional Counseling 3 |
| CJ 4309 | | Comparative Correctional Systems 3 |
| CJ 4310 | | Community Corrections 3 |
| CJ 4311 | | Probation and Parole 3 |
| Electives | | |
| Criminal justice and security electives | | 6 |
| Other electives | | 9 |
| Total Quarter Hours | | 96 |

**Corrections
Bachelor of
Science
Degree
(Major Code
948)**



| Core Courses | | | | quarter hours |
|---|----------|----------|---|----------------------|
| ECN 4115 | ECN 4116 | ECN 4117 | Economic Principles and Problems 1,2, 3 | 9 |
| ENG 4110 | ENG 4111 | | Critical Writing 1,2 | 6 |
| ENG 4112 | | | Approaches to Literature | 3 |
| HST 4101 | | | The Civilization of the Ancient and Medieval Worlds | 3 |
| HST 4103 | | | The Civilization of the Modern World | 3 |
| HST 4202 | | | American History 1848-1917 | 3 |
| PHL 4100 | | | Philosophical Thinking | (3) |
| or | | | or | |
| PHL 4200 | | | Logic | (3) |
| POL 4103 | | | Introduction to Politics | 3 |
| POL 4104 | | | Introduction to American Government | 3 |
| PSY 4110 | | | Introduction to Psychology: Fundamental Issues | 3 |
| PSY 4112 | | | Introduction to Psychology: Personal Dynamics | 3 |
| SOC 4100 | | | Roles, Culture and the Individual | 3 |
| SOC 4102 | | | Institutions and Social Change | 3 |
| SOC 4186 | | | Social Control | 3 |
| Mathematics/science courses | | | | 6 |
| CJ 4101 | | | Administration of Criminal Justice | 3 |
| CJ 4102 | | | Crime Prevention and Security | 3 |
| CJ 4103 | | | Criminology | 3 |
| CJ 4104 | | | Dimensions of Crime | 3 |
| CJ 4105 | | | Computer Applications in Criminal Justice | 3 |
| CJ 4106 | CJ 4107 | | Criminal Justice Research 1,2 | 6 |
| CJ 4108 | CJ 4109 | | Criminal Law and Procedure 1,2 | 6 |
| CJ 4110 | | | Constitutional Law | 3 |
| Major Concentration Courses | | | | |
| CJ 4301 | | | American Correctional System | 3 |
| CJ 4302 | CJ 4303 | | Correctional Administration 1,2 | 6 |
| CJ 4304 | | | Jail Administration and Management | 3 |
| CJ 4305 | | | Case Management and Correctional Services | 3 |
| CJ 4306 | | | Correctional Security Methods and Technology | 3 |
| CJ 4307 | | | The Rights of Offenders and Prisoners | 3 |
| CJ 4308 | | | Correctional Counseling | 3 |
| CJ 4309 | | | Comparative Correctional Systems | 3 |
| CJ 4310 | | | Community Corrections | 3 |
| CJ 4311 | | | Probation and Parole | 3 |
| Electives | | | | |
| Criminal justice and security electives | | | | 24 |
| Other electives | | | | 30 |
| Total Quarter Hours | | | | 174 |

**Policing
Associate in
Science
Degree
(Major Code
947)**



| Core Courses | | | quarter hours |
|---|----------|--|---------------|
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | 6 |
| ENG 4112 | | Approaches to Literature | 3 |
| HST 4202 | | American History 1848-1917 | 3 |
| POL 4104 | | Introduction to American Government | 3 |
| PSY 4110 | | Introduction to Psychology: Fundamental Issues | 3 |
| SOC 4100 | | Roles, Culture, and the Individual | 3 |
| SOC 4186 | | Social Control | 3 |
| CJ 4101 | | Administration of Criminal Justice | 3 |
| CJ 4102 | | Crime Prevention and Security | 3 |
| CJ 4103 | | Criminology | 3 |
| CJ 4104 | | Dimensions of Crime | 3 |
| CJ 4105 | | Computer Applications in Criminal Justice | 3 |
| CJ 4108 | CJ 4109 | Criminal Law and Procedure 1, 2 | 6 |
| CJ 4110 | | Constitutional Law | 3 |
| Major Concentration Courses | | | |
| CJ 4201 | CJ 4202 | Criminal Investigation 1, 2 | 6 |
| CJ 4203 | CJ 4204 | Criminalistics 1, 2 | 6 |
| CJ 4205 | CJ 4206 | Patrol Theory and Administration 1, 2 | 6 |
| CJ 4207 | | Comparative Police Systems | 3 |
| CJ 4208 | | Police Operations | 3 |
| CJ 4209 | CJ 4210 | Police Management 1, 2 | 6 |
| CJ 4211 | | Police and Social Problems | 3 |
| Electives | | | |
| Criminal justice and security electives | | | 6 |
| Other electives | | | 9 |
| Total Quarter Hours | | | 96 |

**Policing
Bachelor of
Science
Degree
(Major
Code 946)**



| Core Courses | | | quarter hours |
|-----------------------------|----------|----------|---|
| ECN 4115 | ECN 4116 | ECN 4117 | Economic Principles and Problems 1,2,3 9 |
| ENG 4110 | ENG 4111 | | Critical Writing 1, 2 6 |
| ENG 4112 | | | Approaches to Literature 3 |
| HST 4101 | | | The Civilization of the Ancient and Medieval Worlds 3 |
| HST 4103 | | | The Civilization of the Modern World 3 |
| HST 4202 | | | American History 1848-1917 3 |
| PHL 4100 | | | Philosophical Thinking (3) |
| or | | or | |
| PHL 4200 | | | Logic (3) |
| POL 4103 | | | Introduction to Politics 3 |
| POL 4104 | | | Introduction to American Government 3 |
| PSY 4110 | | | Introduction to Psychology: Fundamental Issues 3 |
| PSY 4112 | | | Introduction to Psychology: Personal Dynamics 3 |
| SOC 4100 | | | Roles, Culture and the Individual 3 |
| SOC 4102 | | | Institutions and Social Change 3 |
| SOC 4186 | | | Social Control 3 |
| Mathematics/science courses | | | 6 |
| CJ 4101 | | | Administration of Criminal Justice 3 |
| CJ 4102 | | | Crime Prevention and Security 3 |
| CJ 4103 | | | Criminology 3 |

| | | | |
|---|---------|---|------------|
| CJ 4104 | | Dimensions of Crime | 3 |
| CJ 4105 | | Computer Applications in Criminal Justice | 3 |
| CJ 4106 | CJ 4107 | Criminal Justice Research 1, 2 | 6 |
| CJ 4108 | CJ 4109 | Criminal Law and Procedure 1, 2 | 6 |
| CJ 4110 | | Constitutional Law | 3 |
| Major Concentration Courses | | | |
| CJ 4201 | CJ 4202 | Criminal Investigation 1, 2 | 6 |
| CJ 4203 | CJ 4204 | Criminalistics 1, 2 | 6 |
| CJ 4205 | CJ 4206 | Patrol Theory and Administration 1, 2 | 6 |
| CJ 4207 | | Comparative Police Systems | 3 |
| CJ 4208 | | Police Operations | 3 |
| CJ 4209 | CJ 4210 | Police Management 1, 2 | 6 |
| CJ 4211 | | Police and Social Problems | 3 |
| Electives | | | |
| Criminal justice and security electives | | | 24 |
| Other electives | | | 30 |
| Total Quarter Hours | | | 174 |

**Security
Associate in
Science
Degree
(Major
Code 943)**



| Core Courses | | quarter hours | |
|---|----------|---|-----------|
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | 6 |
| ENG 4112 | | Approaches to Literature | 3 |
| HST 4202 | | American History 1848-1917 | 3 |
| POL 4104 | | Introduction to American Government | 3 |
| PSY 4110 | | Introduction to Psychology: Fundamental Issues | 3 |
| SOC 4100 | | Roles, Culture, and the Individual | 3 |
| SOC 4186 | | Social Control | 3 |
| CJ 4101 | | Administration of Criminal Justice | 3 |
| CJ 4102 | | Crime Prevention and Security | 3 |
| CJ 4103 | | Criminology | 3 |
| CJ 4104 | | Dimensions of Crime | 3 |
| CJ 4105 | | Computer Applications in Criminal Justice | 3 |
| CJ 4108 | CJ 4109 | Criminal Law and Procedure 1, 2 | 6 |
| CJ 4110 | | Constitutional Law | 3 |
| Major Concentration Courses | | | |
| CJ 4201 | CJ 4202 | Criminal Investigation 1, 2 | 6 |
| CJ 4403 | | Introduction to Security | 3 |
| CJ 4404 | | Industrial Safety and Fire Prevention | 3 |
| CJ 4405 | | Current Security Problems | 3 |
| CJ 4406 | CJ 4407 | Security Administration 1, 2 | 6 |
| CJ 4408 | | Legal Aspects of Security Management and Operations | 3 |
| CJ 4409 | CJ 4410 | Physical Security Methods and Technology 1, 2 | 6 |
| CJ 4411 | | Electronic Information Security | 3 |
| Electives | | | |
| Criminal justice and security electives | | | 6 |
| Other electives | | | 9 |
| Total Quarter Hours | | | 96 |

**Security
Bachelor of
Science
Degree
(Major
Code 942)**



Core Courses

quarter hours

| | | | | |
|-----------------------------|----------|----------|---|-----|
| ECN 4115 | ECN 4116 | ECN 4117 | Economic Principles and Problems 1, 2, 3 | 9 |
| ENG 4110 | ENG 4111 | | Critical Writing 1, 2 | 6 |
| ENG 4112 | | | Approaches to Literature | 3 |
| HST 4101 | | | The Civilization of the Ancient and Medieval Worlds | 3 |
| HST 4103 | | | The Civilization of the Modern World | 3 |
| HST 4202 | | | American History 1848-1917 | 3 |
| PHL 4100 | | | Philosophical Thinking | (3) |
| or | | | or | |
| PHL 4200 | | | Logic | (3) |
| POL 4103 | | | Introduction to Politics | 3 |
| POL 4104 | | | Introduction to American Government | 3 |
| PSY 4110 | | | Introduction to Psychology: Fundamental Issues | 3 |
| PSY 4112 | | | Introduction to Psychology: Personal Dynamics | 3 |
| SOC 4100 | | | Roles, Culture, and the Individual | 3 |
| SOC 4102 | | | Institutions and Social Change | 3 |
| SOC 4186 | | | Social Control | 3 |
| Mathematics/science courses | | | | 6 |
| CJ 4101 | | | Administration of Criminal Justice | 3 |
| CJ 4102 | | | Crime Prevention and Security | 3 |
| CJ 4103 | | | Criminology | 3 |
| CJ 4104 | | | Dimensions of Crime | 3 |
| CJ 4105 | | | Computer Applications in Criminal Justice | 3 |
| CJ 4106 | CJ 4107 | | Criminal Justice Research 1, 2 | 6 |
| CJ 4108 | CJ 4109 | | Criminal Law and Procedure 1, 2 | 6 |
| CJ 4110 | | | Constitutional Law | 3 |

Major Concentration Courses

| | | | | |
|---------|---------|--|---|---|
| CJ 4201 | CJ 4202 | | Criminal Investigation 1, 2 | 6 |
| CJ 4403 | | | Introduction to Security | 3 |
| CJ 4404 | | | Industrial Safety and Fire Prevention | 3 |
| CJ 4405 | | | Current Security Problems | 3 |
| CJ 4406 | CJ 4407 | | Security Administration 1, 2 | 6 |
| CJ 4408 | | | Legal Aspects of Security Management and Operations | 3 |
| CJ 4409 | CJ 4410 | | Physical Security Methods and Technology 1, 2 | 6 |
| CJ 4411 | | | Electronic Information Security | 3 |

Electives

| | |
|---|----|
| Criminal justice and security electives | 24 |
| Other electives | 30 |

| | |
|----------------------------|------------|
| Total Quarter Hours | 174 |
|----------------------------|------------|

Health Professions and Sciences Degree Programs

Dr. Paula M. Vosburgh, *Assistant
Dean, Director,
Health Professions and Sciences
Programs*

266 Ryder Hall
617-437-2818

Program Directors and Coordinators

Area program directors and the Director of Health Professions and Sciences Programs have overall responsibility for the academic quality of the health

programs in their areas of specialty. *The program coordinators for each area serve as the chief academic advisors for students in their programs.*

Health Professions

EMS: Paramedic Technology
Consultant:

Glen Boden (Boston Bouvé College of Human Development Professions) (617-437-2665)

HMG: Health Management
Consultant:

Dr. Carl W. Nelson (Health Care Area Coordinator, College of Business Administration) (617-437-4751)

HRA: Health Record Administration
Acting Program Director:

Asst. Prof. Leslie Blide (College of Pharmacy and Allied Health Professions) (617-437-4203)

Program Coordinator:
Annalee Collins (College of Pharmacy and Allied Health Professions) (617-437-2525)

Clinical Coordinator:
Honey Schmase (College of Pharmacy and Allied Health Professions) (617-437-3614)

HSC: Health Science
Consultant:

Dr. Theodore Blank (617-734-6102)

MLS: Medical Laboratory Science
Program/Clinical Coordinator:
Barbara Martin (College of Pharmacy and Allied Health Professions) (617-437-4194)

NUR: Nursing
Academic Coordinator:
Sandra Conant (University College) (617-437-2818)

RAD: Radiologic Technology
Program Director:
Kevin J. Powers (University College) (617-437-2818)
Assistant Director:
Valerie A. Lamb (University College) (617-437-2818)

REC: Therapeutic Recreation
Consultant:
Dr. George Ransom (Boston-Bouvé College of Human Development Professions) (617-437-3167)

Sciences

BIO: Biology
Consultant:
Dr. Fred A. Rosenberg (College of Arts and Sciences) (617-437-4042)
Laboratory Coordinator:
Kevin Mautte (Biology Department) (617-437-2260)

CHM: Chemistry
Consultant:
Dr. Philip W. LeQuesne (College of Arts and Sciences) (617-437-2858)
Assistant Coordinator:
Jean Cathron (College of Arts and Sciences) (617-437-2383)

Laboratory Coordinator:
Bernard Lemire (College of Arts and Sciences) (617-437-4381)

Biotechnology
Major Advisor:
Dr. Carl F. Moxey (Senior Lecturer in Biology) (617-437-2260)

ESC: Earth Science
Consultant:
Dr. Malcolm Hill (College of Arts and Sciences) (617-437-4381)

MTH: Mathematics
Consultant:
Francis X. Finigan (Educational Consultant) (617-484-8496)

Purpose

University College offers part-time programs in allied health to prepare students for advancement and service in hospitals and other health agencies.

The associate's and bachelor's degree programs are designed to provide both professional specialization and general

education. All programs meet the accreditation standards of the Committee on Allied Health Education and Accreditation (CAHEA) of the American Medical Association (AMA) and/or of licensing or registration boards where such exist.

Clinical Assignments

Clinical assignments are generally available for students whose programs require applied study in a clinical setting. Clinical practice is conducted at hospitals or other health agencies in the Greater Boston area. Positions in applied clinical studies are often offered on a competitive basis, with the student's academic performance used as the basis for acceptance.

Most clinicals require liability insurance and a health clearance. Students should check with clinical coordinator of the program for exact details.

Students who accept clinical assignments in health facilities are expected to adhere to the requirements of the facilities, which are outside University control.

Special Studies and Certificates

U.C. offers a variety of Special Studies. These courses give students an opportunity to earn credits in Advanced Tutorials, Independent Studies, Honors Programs, and Field Work. Consult descriptions on pages 20-21. Students should be aware that special criteria exist for certain courses and the course description should be consulted.

Students can choose a certificate program to learn new skills or enhance skills they already have. If the student wishes to continue many certificates are transferable into related degree

programs. Health and Science certificates are listed below:

| | |
|---|------------|
| Biomedical Illustration | (page 38) |
| Phlebotomy Professional Preparation | (page 58) |
| Human Development Services: | |
| Specialties in: Gerontology, Learning Disabilities, Infant/Child Care and Adolescent Care | (page 45) |
| Ultrasonographic Studies | (page 52) |
| Post Baccalaureate in Health Records | (page 99) |
| Activity Leader | (page 108) |

Preprofessional Medical Courses

The information provided below is for students who plan to apply for admission to schools of medicine, osteopathy, dentistry, podiatry, or optometry. Those who wish to pursue veterinary

medicine may need to meet different entrance requirements and should consult the chair of the Health Professions Advisory Committee for additional advice.

Medical School Admission Requirements

Students must complete the following courses before they may enroll in medical school, and should complete them before taking the school's particular admission test (MCAT, DAT, and so on).

Biology: one year (with labs)
General chemistry: one year (with labs)
Organic chemistry: one year (with labs)
Physics: one year (with labs)
College mathematics: one year (with some calculus)
College English: one year

Northeastern University's Health Professions Advisory Committee provides academic advice and help with professional school applications for students in any of the University's health programs. Although advice is available to anyone enrolled in a course, the Committee can prepare evaluation letters only for those who have taken enough course work at Northeastern to be able to have at least two Northeastern faculty members write letters to the Committee.

Sources of Advice:

General Counseling and Referrals
Dr. C. H. Ellis, Jr.

Chair, Health Professions Advisory
Committee

Biology Department
Northeastern University
445 Richards Hall
617-437-4032

Applications and Entrance Exams
Professor T. J. McEneaney
Office of Career Development and
Placement

Northeastern University
124 Ryder Hall
617-437-2430

Course Schedules and Counseling
Dr. Paula Vosburgh
Assistant Dean
Director, Health Professions and
Sciences Programs
University College
266 Ryder Hall
617-437-2818

Course Sequences to Meet Minimum Admission Requirements

The following list shows acceptable course sequences that students can take in preparation for health professional schools. Completing one sequence from each category should meet the *minimum* requirements of most medical or dental schools. If you have questions about whether other courses might be applicable, talk with Dr. Vosburgh or Dr. Ellis.

General Biology BIO 4103, BIO 4104, BIO 4105—lab *must* be taken. Other biology work, such as anatomy and physiology and microbiology, may be acceptable, depending on the professional school. General biology is highly recommended even if you have already taken the other courses.

General Chemistry CHM 4111, CHM 4112, CHM 4113—lab *must* be taken

Organic Chemistry CHM 4261, CHM 4262, CHM 4263—lab *must* be taken
General Physics PHY 4117, PHY 4118, PHY 4119, and labs
PHY 4173, PHY 4174*
Math MTH 4108, MTH 4120, MTH 4121*
English ENG 4110, ENG 4111, ENG 4112

Two additional areas that are often required are behavioral science and biochemistry. The following courses meet these requirements.

Behavioral Science PSY 4110, PSY 4111, PSY 4112, and/or other psychology courses
Biochemistry CHM 4371, CHM 4372, CHM 4373 or BIO 4246, BIO 4247, BIO 4248

*These courses are scheduled through the School of Engineering Technology. Call 617-437-2500 for more information.

Biotechnology

Associate in Science Degree

The program in Biotechnology helps provide the chemistry and biology foundation required for medical and industrial laboratory assistants and technicians and for persons who have paramedical responsibilities. Employment opportunities may be found in hospitals, health clinics, research foundations, chemical and drug industries, public health organizations, water and sanitation departments.

Bachelor of Science Degree

The Bachelor of Science degree program in Biotechnology integrates theoretical and laboratory courses from the fields of chemistry and biology. The program is designed to help prepare students for responsibilities in laboratory careers. Employment opportunities may be found in a variety of industrial, pharmaceutical, clinical, and hospital laboratories.

**Biotechnology
Associate in
Science
Degree (Major
Code 812)**



Core Courses

quarter hours

| | | | |
|--------------------------------------|----------|--------------------------|--------------|
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | 6 |
| ENG 4112 | | Approaches to Literature | 3 |
| History (HST) Courses of your choice | | | 9 |
| MTH 4110 | MTH 4111 | MTH 4112 | Math 1, 2, 3 |
| | | | 9 |

Major Concentration Courses

| | | | | |
|----------|----------|----------|--------------------------------------|------|
| BIO 4103 | BIO 4104 | BIO 4105 | Biology 1, 2, 3 | 12 |
| BIO 4175 | BIO 4176 | BIO 4177 | Human Anatomy and Physiology 1, 2, 3 | 9 |
| BIO 4190 | BIO 4191 | BIO 4192 | Microbiology 1, 2, 3 | 9 |
| CHM 4111 | CHM 4112 | CHM 4113 | General Chemistry 1, 2, 3 | 9 |
| CHM 4261 | CHM 4262 | CHM 4263 | Organic Chemistry 1, 2, 3 | (12) |
| or | | or | | |
| CHM 4221 | CHM 4222 | CHM 4223 | Analytical Chemistry 1, 2, 3 | (9) |
| PHY 4101 | PHY 4102 | | College Physics 1, 2 | 8 |

Electives

| | |
|--------------|---|
| Liberal Arts | 6 |
|--------------|---|

Chemistry, Biology, or Calculus as needed to complete total credits

Total Quarter Hours

97-100

**Biotechnology
Bachelor of
Science
Degree (Major
Code 813)**



Core Courses

quarter hours

| | | | | |
|--|----------|----------|--------------------------------------|----|
| ENG 4110 | ENG 4111 | | Critical Writing 1, 2 | 6 |
| ENG 4112 | | | Approaches to Literature | 3 |
| MTH 4110 | MTH 4111 | MTH 4112 | Math 1, 2, 3 | 9 |
| BIO 4103 | BIO 4104 | BIO 4105 | Biology 1, 2, 3 | 12 |
| BIO 4175 | BIO 4176 | BIO 4177 | Human Anatomy and Physiology 1, 2, 3 | 9 |
| CHM 4111 | CHM 4112 | CHM 4113 | General Chemistry 1, 2, 3 | 9 |
| PHY 4101 | PHY 4102 | | College Physics 1, 2 | 8 |
| Economics (ECN) Courses of your choice | | | | 6 |
| History (HST) Courses of your choice | | | | 9 |
| Psychology (PSY) or Sociology (SOC) courses of your choice | | | | 9 |

Major Concentration Courses

| | | | | |
|----------|----------|----------|-------------------------------|-----|
| BIO 4190 | BIO 4191 | BIO 4192 | Microbiology 1, 2, 3 | 9 |
| BIO 4224 | BIO 4225 | BIO 4226 | Ecology 1, 2, 3 | 9 |
| BIO 4235 | BIO 4236 | BIO 4237 | Genetics 1, 2, and Lab | (8) |
| or | | or | | |
| BIO 4246 | BIO 4247 | BIO 4248 | Cell Biology 1, 2, and Lab | (8) |
| BIO 4374 | BIO 4375 | BIO 4376 | Histology 1, 2, 3 | 9 |
| BIO 4456 | | | Introduction to Biotechnology | 3 |
| CHM 4221 | CHM 4222 | CHM 4223 | Analytical Chemistry 1, 2, 3 | 9 |
| CHM 4261 | CHM 4262 | CHM 4263 | Organic Chemistry 1, 2, 3 | 12 |
| CHM 4321 | CHM 4322 | | Instrumental Analysis 1, 2 | 6 |
| CHM 4323 | | | Radiochemistry | (3) |
| or | | or | | |
| CHM 4333 | | | Chemical Separations | (3) |
| CHM 4371 | CHM 4372 | CHM 4373 | Biochemistry 1, 2, 3 | (9) |

Biotechnology electives

Choose 9 q.h. from the following:

| | | | |
|----------|----------|-----------------------------------|-----|
| BIO 4411 | BIO 4412 | Embryology and Development 1, 2 | (6) |
| BIO 4441 | | Parasitology | (4) |
| BIO 4133 | | Special Topics in Botany | (3) |
| BIO 4461 | | Immunology | (4) |
| CHM 4271 | | Introduction to Immunodiagnostics | (3) |
| CHM 4391 | | Introduction to Recombinant DNA | (3) |

continued on next page

| | | |
|----------------------------|---|------------|
| CHM 4392 | Affinity Chromatography in Biological Separations | (3) |
| Earth Science Elective | | 3 |
| Electives | | 6 |
| Total Quarter Hours | | 175 |

Health Management

The health care industry is changing rapidly in response to increasing competition, rising costs, technological advances, the growth of alternative delivery systems, and an aging population.

University College's Bachelor of Science Degree program in Health Management is intended for those who wish to prepare, on a part-time basis, for entry into or advancement in

managerial positions in the health care field.

The program combines professional competencies with a liberal arts education to help direct students toward either entry-level positions or positions of increasing responsibility in health services administration. The curriculum also provides a foundation for graduate studies in MBA and MHA programs.

Health Management Bachelor of Science Degree (Major Code 860)



Core Courses

General Education

quarter hours

| | | | | |
|----------|----------|----------|--|---|
| ENG 4110 | ENG 4111 | | Critical Writing 1, 2 | 6 |
| ENG 4112 | | | Approaches to Literature | 3 |
| MTH 4110 | MTH 4111 | MTH 4112 | Math 1, 2, 3 | 9 |
| HMG 4200 | | | Health Science Statistics | 3 |
| ECN 4115 | ECN 4116 | ECN 4117 | Economic Principles and Problems 1,2,3 | 9 |
| SOC 4100 | | | Roles, Culture, and the Individual | 3 |
| POL 4103 | | | Introduction to Politics | 3 |
| PSY 4110 | | | Introduction to Psychology: Fundamental Issues | 3 |
| COM 4101 | | | Foundations of Computer Literacy | 4 |

Management

| | | | |
|----------|----------|--|---|
| MGT 4101 | MGT 4102 | Introduction to Business and Management 1, 2 | 6 |
| ACC 4101 | ACC 4102 | Accounting Principles 1, 2 | 6 |
| FI 4301 | | Principles of Finance | 3 |
| HRM 4301 | | Organizational Behavior | 3 |
| MKT 4301 | | Introduction to Marketing 1 | 3 |

Major Concentration Courses

| | | | |
|----------|----------|---|-----|
| HMG 4301 | | Health Care Delivery Systems | 3 |
| HMG 4100 | HMG 4101 | Hospital Organization and Management 1, 2 | 6 |
| HMG 4325 | | Health Planning and Regulation | 3 |
| HRA 4302 | | Medical Terminology Survey | (3) |
| or | | or | |
| HRA 4305 | | Language of Medicine* | (2) |
| HMG 4390 | | The Patients' Impact on Decision-Making | 3 |
| HSC 4310 | | Public Health 1 | 3 |
| HMG 4580 | | Information Processing in Health Care | 3 |

*A challenge examination exists for this course. Call 617-437-2525 for details.

| | | | |
|----------|----------|--------------------------------------|---|
| HMG 4215 | | Health Law | 3 |
| HMG 4400 | HMG 4401 | Health Care Financial Management 1,2 | 6 |

continued on next page

| | | |
|----------|---|---|
| HMG 4445 | Health Care Marketing and Communication | 3 |
| HMG 4440 | Health Care Operations Management | 3 |
| HMG 4260 | Senior Seminar in Health Care Management** | 1 |
| HMG 4429 | Health Care Delivery's Changing Environment** | 2 |
| HMG 4650 | Health Management Practicum 1† | 6 |
| HMG 4651 | Health Management Practicum 2† | 6 |

Electives

| | |
|---|-------|
| Liberal Arts electives | 12 |
| Health Science or Health Management electives | 6 |
| Science electives (CHM, BIO, ESC, MTH) | 12-13 |

**Must be taken concurrently during the student's last year in the program.

†Students must have completed seventy-five percent of their degree requirements before taking these courses. Students must apply for each assignment no later than two full quarters prior to the desired starting date.

Professional Specialization

Students complete their course of study by electing one of the following

24-quarter-hour options designed to meet their professional objectives.

Option 1: Continuing Care Administration

Licensure as a nursing home administrator requires an internship, a licensure examination, and a bachelor's degree. The required courses in this option help prepare students for the Massachusetts Licensure

Examination. Students are advised, however, to contact the Board of Registration of Nursing Home Administrators for the specific eligibility requirements needed for this examination.

| | | | | |
|--|----------|----------|--|-----|
| HMG 4600 | HMG 4601 | HMG 4602 | Long-Term Care Administration (A, B, C)* | 18 |
| <i>Choose nine quarter hours from the following.</i> | | | | |
| SOC 4225 | | | Social Gerontology | (3) |
| HMG 4300 | | | Home Health Care | (3) |
| HSC 4610 | | | Geriatric Nutrition | (3) |
| REC 4401 | | | The Nursing Home Experience | (3) |
| REC 4460 | | | The Process of Aging | (3) |
| HSC 4210 | | | Basic Nutrition | (3) |
| HSC 4220 | | | Basic Pharmacology | (3) |

*This series of courses offered in odd numbered academic years.

Option 2: Community Health Management

| | | | |
|----------|----------|---|---|
| HMG 4310 | HMG 4311 | Principles and Practices of Community Health 1, 2 | 6 |
| MLS 4341 | MLS 4342 | Epidemiology 1, 2 | 6 |
| HSC 4311 | | Public Health 2 | 3 |

Choose twelve quarter hours from the following.

| | | | |
|----------|----------|--|-----|
| ACC 4110 | | Management Control for Nonprofit Organizations | (3) |
| HMG 4300 | | Home Health Care | (3) |
| HMG 4550 | HMG 4551 | Contemporary and Controversial Health Care Issues 1, 2 | (6) |
| HMG 4610 | | Principles and Practices of Community Mental Health | (3) |

continued on next page

| | | |
|----------|--|-----|
| HRM 4320 | Techniques of Employee Selection | (3) |
| HRM 4340 | Public Sector Collective Bargaining in the United States | (3) |
| HSC 4315 | Environmental Problems and Health | (3) |
| MKT 4335 | Public Relations 1 | (3) |
| SOC 4215 | Medical Sociology | (3) |
| SOC 4241 | Human Services Professions | (3) |
| SOC 4240 | Sociology of Human Service Organizations | (3) |

Option 3: General

| | | |
|---|---|------------|
| <i>Choose courses from (EMS, HMG, HRA, HSC, MLS, REC, RAD)*</i> | | 15 |
| <i>Choose 12 quarter hours from the following.</i> | | |
| ECN 4130 | Medical Economics | (3) |
| ECN 4321 | Urban Economic Problems and Policies | (3) |
| ENG 4380 | Business Writing and Reports 1 | (3) |
| FI 4326 | Financial Control | (3) |
| FI 4325 | Budgeting and Planning | (3) |
| FI 4321 | Credit Management | (3) |
| HRM 4321 | Wage and Salary Administration | (3) |
| HRM 4322 | Employee Benefits | (3) |
| HRM 4323 | Job Evaluation | (3) |
| HRM 4341 | Private Sector Collective Bargaining in the United States | (3) |
| MGT 4320 | Managing Change | (3) |
| POL 4300 | Introduction to Public Administration | (3) |
| Total Quarter Hours | | 175 |

*These courses *must* be taken at Northeastern University.

Health Record Administration

The health record administrator's varied responsibilities relate to health information systems and include the organization, operation, and management of health record services. Required skills for this profession include the ability to design health information and retrieval systems; plan, organize, and direct health record services; develop, analyze, and evaluate health records and indexes; work with medical and administrative staffs in developing methods for evaluation of

patient care; and conduct research projects using health care information.

Students who successfully complete this program qualify for admission to the professional registration examinations conducted by the American Medical Record Association.

Potential students must be interviewed by the Program Director. Arrangements can be made through the Health Records Office, 205 Mugar Building, telephone 617-437-3663.

Professional Certification

An individual who wishes to qualify for registration as a medical record administrator and who already holds a bachelor's degree in another field of study from a college or university acceptable to Northeastern University may take the Health Record Administration Certificate Program. Upon completion of this program with a cumulative quality-point average of 2.5 or higher, students will receive

certification from University College. In addition to the required courses, students must complete one year of a natural science, such as biology, chemistry, or microbiology. Students must also demonstrate an understanding of the principles of descriptive statistics. This requirement may be satisfied by successful completion of an approved statistics course with a grade of C or better.

These requirements are in addition to the laboratory course in anatomy and physiology.

In designated professional courses (*), students must obtain a grade of C or better. Only one professional course may be repeated. Students who receive a grade of D in more than one pro-

fessional course will be asked to withdraw from the program.

Students who apply for the clinical courses HRA 4335, HRA 4336, and HRA 4337 must have a quality-point average of 2.5 and the approval of their advisor.

**Health Record
Administration
Bachelor of
Science
Degree (Major
Code 866)**



| Core Courses | | | | quarter hours |
|---|----------|----------|---|---------------|
| ENG 4110 | ENG 4111 | | Critical Writing 1, 2 | 6 |
| ENG 4112 | | | Approaches to Literature | 3 |
| MTH 4110 | MTH 4111 | | Math 1, 2 | 6 |
| ECN 4115 | ECN 4116 | ECN 4117 | Economic Principles and Problems 1, 2, 3 | 9 |
| Psychology (PSY) Courses of your choice | | | | 9 |
| BIO 4103 | BIO 4104 | BIO 4105 | Biology 1, 2, 3 | 12 |
| BIO 4175 | BIO 4176 | BIO 4177 | Human Anatomy and Physiology 1, 2, 3* | 9 |
| ECN 4250 | ECN 4251 | | Statistics 1, 2 | (6) |
| or | | | | |
| HMG 4200 | | | Health Science Statistics | (3) |
| Choose either: | | | | |
| History (HST) or Political Science (POL) Courses of your choice | | | | 9 |
| Sociology (SOC) Courses of your choice | | | | 9 |
| Major Concentration Courses | | | | |
| HMG 4215 | | | Health Law* | 3 |
| HMG 4301 | | | Health Care Delivery Systems* | 3 |
| HRA 4305 | HRA 4306 | | Language of Medicine 1, 2† | 4 |
| HRA 4308 | | | Hospital Management for Health Record Administrators* | 3 |
| HRA 4310 | HRA 4311 | HRA 4312 | Health Record Science 1, 2, 3* | 18 |
| HRA 4313 | HRA 4314 | | Health Record Science 4, 5* | 12 |
| HRA 4320 | HRA 4321 | HRA 4322 | Organization of the Health Record Department 1, 2, 3 | 9 |
| HRA 4335 | HRA 4336 | HRA 4337 | Clinical Practicum 1, 2, 3* | 8 |
| HRA 4330 | | | Health Record Computer Science* | 3 |
| HRA 4332 | | | Topics in Health Records | 3 |
| HRM 4301 | | | Organizational Behavior | 3 |
| HSC 4301 | HSC 4302 | | Pathophysiology 1, 2 | 6 |
| MIS 4101 | | | Introduction to Data Processing and Information Systems 1 | (3) |
| or | | | | |
| COM 4101 | | | Foundations of Computer Literacy | (4) |
| Social science or humanities electives | | | | 20-24 |
| Total Quarter Hours | | | | 177 |

*Students must obtain a grade of C or better in this course.

†A challenge examination is available for this course. Call 617-437-2525 for details.

Health Record Administration Post- Baccalaureate Certificate (Major Code 867)



Core Courses

quarter hours

| | | | | |
|----------|----------|----------|---|-----|
| BIO 4175 | BIO 4176 | BIO 4177 | Human Anatomy and Physiology 1, 2, 3 | 9 |
| HMG 4215 | | | Health Law | 3 |
| HMG 4301 | | | Health Care Delivery Systems | 3 |
| HRA 4305 | HRA 4306 | | Language of Medicine 1, 2* | 4 |
| HRA 4308 | | | Hospital Management for Health Record Administrators | 3 |
| HRA 4310 | HRA 4311 | HRA 4312 | Health Record Science 1, 2, 3 | 18 |
| HRA 4313 | HRA 4314 | | Health Record Science 4, 5 | 12 |
| HRA 4320 | HRA 4321 | HRA 4322 | Organization of the Health Record Department 1, 2, 3 | 9 |
| HRA 4324 | HRA 4325 | HRA 4326 | Applied Health Record Science 1, 2, 3 | 8 |
| HRA 4330 | | | Health Record Computer Science | 3 |
| HRA 4332 | | | Topics in Health Records | 3 |
| HSC 4301 | HSC 4302 | | Pathophysiology 1, 2 | 6 |
| MIS 4101 | | | Introduction to Data Processing and Information Systems 1 | (3) |
| or | | | or | |
| COM 4101 | | | Foundations of Computer Literacy | (4) |

Total Quarter Hours

84-85

*A challenge examination is available for this course. Call 617-437-2525 for details.

Health Science

With the rapidly changing health care industry and the steadily expanding awareness of the importance of health, many new and exciting opportunities exist for those interested in the health care field. The Bachelor of Science in Health Science program seeks to address the needs of both health professionals seeking a broad based baccalaureate degree as well as those interested in investigating a variety of disciplines within health. For those who already possess training as health professionals, maximum transfer of professional course work is possible. Those entering from other fields or investigating career options in health will find a curriculum which allows flexibility in choosing course work

towards a specific goal. A program of upper level courses and advanced sciences allows the student flexibility in pursuing a variety of post baccalaureate options as well.

Students should be aware that in order to work in certain health professions, certification or licensure is required. If you are interested in a field such as: Medical Laboratory Science (Clinical Chemistry, Clinical Microbiology, Hematology, Blood Banking, Clinical Immunology); Sonography; Paramedic; etc., you should see the appropriate individual in that area. Please refer to page 91 in the *Bulletin* for names and telephone numbers of consultants in various health fields.

Health Science Bachelor of Science in Health Science Degree (Major Code 865)



Liberal Arts

quarter hours

| | | | | |
|--|----------|----------|--------------------------|---|
| ENG 4110 | ENG 4111 | | Critical Writing 1, 2 | 6 |
| ENG 4112 | | | Approaches to Literature | 3 |
| Humanities (ART, ASL, DRA, ENG, JRN, LN, MUS, PHL, SPC, TCC) | | | | 9 |
| Social Sciences (ECN, HST, POL, PSY, SOA, SOC) | | | | 9 |
| General Liberal Studies (ART, ASL, DRA, ENG, JRN, LN, MUS, PHL, SPC, TCC, ECN, HST, POL, PSY, SOA, SOC) | | | | 6 |
| MTH 4110 | MTH 4111 | MTH 4112 | Mathematics 1, 2, 3 | 9 |
| Basic Sciences | | | | |
| BIO 4103 | | | Biology 1 | 4 |
| BIO 4104 | or | BIO 4105 | Biology 2 or 3 | 4 |

continued on next page

| | | | | |
|----------|----------|----------|--------------------------------------|---|
| BIO 4175 | BIO 4176 | BIO 4177 | Human Anatomy and Physiology 1, 2, 3 | 9 |
| BIO 4190 | | | Microbiology 1 | 3 |
| CHM 4111 | CHM 4112 | CHM 4113 | General Chemistry 1, 2, 3 | 9 |
| COM 4101 | | | Introduction to Computer Literacy | 4 |

Advanced Sciences

Choose 12 quarter hours from the following:

| | | | | |
|----------|----------|----------|------------------------------------|------|
| BIO 4224 | BIO 4225 | BIO 4226 | Ecology 1, 2, 3 | (9) |
| BIO 4235 | BIO 4236 | BIO 4237 | Genetics 1, 2, and Lab | (8) |
| BIO 4246 | BIO 4247 | BIO 4248 | Cell Biology 1, 2, and Lab | (8) |
| BIO 4258 | BIO 4259 | | Advanced Human Physiology 1, 2 | (6) |
| BIO 4320 | | | Medical Microbiology | (4) |
| BIO 4455 | | | Introduction to Biotechnology | (3) |
| BIO 4461 | | | Immunology | (4) |
| CHM 4221 | CHM 4222 | CHM 4223 | Analytical Chemistry 1, 2, 3 | (9) |
| CHM 4224 | | | Analytical Chemistry (summer only) | (4) |
| CHM 4261 | CHM 4262 | CHM 4263 | Organic Chemistry 1, 2, 3 | (12) |
| CHM 4371 | CHM 4372 | CHM 4373 | Biochemistry 1, 2, 3 | (9) |
| MTH 4130 | MTH 4131 | MTH 4132 | College Calculus 1, 2, 3 | (9) |
| PHY 4101 | PHY 4102 | | College Physics 1, 2 | (8) |
| PHY 4117 | PHY 4118 | PHY 4119 | Physics 1, 2, 3 and | |
| PHY 4173 | PHY 4174 | | Labs | (16) |

Basic Concentration Courses

Required

| | | | |
|----------|--|----------------------|---|
| HMG 4215 | | Health Law | 3 |
| HMG 4301 | | Health Care Delivery | 3 |
| HSC 4310 | | Public Health 1 | 3 |
| MLS 4341 | | Epidemiology 1 | 3 |

*Choose 18 quarter hours from the following:**

| | | | |
|----------|----------|---|-----|
| EMS 4107 | | EMT-Basic | (9) |
| HMG 4210 | HMG 4211 | Medical Care and Current Social Problems 1, 2 | (6) |
| HSC 4210 | | Basic Nutrition | (3) |
| HSC 4220 | | Basic Pharmacology | (3) |
| HSC 4311 | | Public Health 2 | (3) |
| HSC 4613 | | Oral Microbiology | (3) |
| HSC 4614 | HSC 4615 | Advanced Periodontology 1, 2 | (6) |
| MLS 4104 | | Introduction to Phlebotomy | (4) |
| MLS 4301 | | Medical Lab Orientation | (2) |
| MLS 4342 | | Epidemiology 2 | (3) |
| RAD 4100 | | Radiologic Technology Orientation | (3) |
| REC 4110 | REC 4111 | Group Dynamics and Leadership 1, 2 | (6) |

*Entry level professional courses (Medical Laboratory Science, Nursing, Radiologic Technology, Paramedic Technology, etc.) may fulfill this requirement. It is imperative that students who desire to follow this option have their courses preapproved by the Office of Academic and Student Affairs. This should be done at the start of your coursework in University College.

Major Concentration Courses

Required

| | | | |
|----------|----------|---|---|
| HMG 4100 | HMG 4101 | Hospital Organization and Management 1, 2 | 6 |
| HMG 4200 | | Health Science Statistics | 3 |
| HSC 4301 | HSC 4302 | Pathophysiology 1, 2 | 6 |
| HSC 4320 | HSC 4321 | Training and Development in the Health Professions 1, 2 | 6 |

continued on next page

Choose 21 quarter hours from the following electives.**

| | | | |
|----------|----------|--|-----|
| HMG 4310 | HMG 4311 | Principles and Practices of Community Health 1, 2 | (6) |
| HMG 4550 | HMG 4551 | Contemporary and Controversial Health Care Issues 1, 2 | (6) |
| HSC 4315 | | Environmental Problems and Health | (3) |
| HSC 4600 | | Advanced Nutrition | (3) |
| HSC 4601 | | Advanced Pharmacology | (3) |
| HSC 4610 | | Geriatric Nutrition | (3) |
| MLS 4321 | | Hematology | (3) |
| MLS 4322 | MLS 4323 | Morphologic Hematology 1, 2 | (6) |
| MLS 4365 | | Quality Control | (3) |
| RAD 4304 | | Cross Sectional Anatomy | (4) |
| RAD 4400 | | Head & Neck Anatomy | (3) |
| RAD 4450 | | Comp. Body Tomography | (3) |
| RAD 4460 | | Medical Imaging Quality Assurance | (3) |
| REC 4460 | | Process of Aging | (3) |

**Others may be considered by petition. Specialized tracks are available in Medical Laboratory and Sonography etc.

Electives as needed to complete total credits.

Total Quarter Hours

174

Medical Laboratory Science—Medical Technology

Medical laboratory science (MLS) is concerned with laboratory examination of material necessary for monitoring health and for diagnosing and treating illness. Medical laboratory technicians and technologists work in a variety of specialized fields such as microbiology, blood banking, hematology, or clinical chemistry, or as generalists in all these areas.

The medical laboratory technician holding an associate's degree works under the direct supervision of a medical technologist and performs most common medical laboratory tests. The medical technologist, who must have a bachelor's degree, is considered qualified to perform tests with little or no direct supervision. Students interested in progressing past a technician level in Medical Laboratory Science should investigate the College of Pharmacy and Allied Health Professions' full-time day bachelor's degree or University College's part-time evenings Bachelor of Science in Health Science. It is imperative that students meet and plan out their course work with the Medical Laboratory Coordinator (617-437-3664) prior to beginning work in this major.

This will assure appropriate course selection in order to qualify for clinical certification(s). With additional education or experience, medical technologists can become educators, researchers, or supervisors. They may serve as sales and technical representatives for scientific supply and equipment companies or serve in government positions.

The associate degree program is conducted in affiliation with Boston-area hospitals and is accredited by the Committee of Allied Health Education and Accreditation of the American Medical Association. Upon successful completion of the associate's degree program, the student is eligible to take a national certification examination given by the National Certification Agency for Medical Laboratory Personnel or the Board of Registry of the American Society of Clinical Pathologists.

The basic courses in medical laboratory science, science, and education are offered evenings, but the advanced medical laboratory science courses and the clinical experience are offered full-time during the day only.

Associate's Degree Professional Requirements

A clinical applied study program (or appropriate work experience) is required toward this degree. Work experience is acceptable if it meets the requirements for certification of either the National Certification Agency for Medical Laboratory Personnel or the Board of Registry of the American Society of Clinical Pathologists. Students without appropriate work experience can apply for clinical applied studies through the University College MLS Clinical Coordinator, 206 Mugar, 617-437-3664. This should be done one year in advance of the anticipated entry into clinical courses.

Prerequisites for clinical applied studies are a minimum of a 2.0 quality-point average in the required courses and a C- or better in each medical laboratory science (MLS) course. These basic courses are available during the evening and on an every-other-year basis through the College of Pharmacy and Allied Health Professions. Students register for these courses in the College of Pharmacy and Allied Health Professions, 206 Mugar. Tuition is at a special rate. These courses should be completed within three years of applying to the AD-MLT Clinical Applied Studies.

Medical Laboratory Science— Medical Laboratory Technician Associate in Science Degree (Major Code 800)



| Core Courses | | | quarter hours | |
|-----------------------------|----------|--|--|-----|
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | 6 | |
| ENG 4112 | | Approaches to Literature | 3 | |
| HMG 4210 | | Medical Care and Current Social Problems | 3 | |
| HMG 4215 | | Health Law | 3 | |
| MTH 4107 | MTH 4108 | College Algebra and Introduction to Calculus | 8 | |
| BIO 4103 | BIO 4104 | BIO 4105 | Biology 1, 2, 3 | 12 |
| BIO 4175 | BIO 4176 | BIO 4177 | Human Anatomy and Physiology 1, 2, 3 | 9 |
| CHM 4111 | CHM 4112 | CHM 4113 | General Chemistry 1, 2, 3 | 9 |
| Major Concentration Courses | | | | |
| MLS 4301 | | | Medical Laboratory Science Orientation | 2 |
| MLS 1311 | | | Basic MLS Urinalysis*† | 2 |
| MLS 1321 | MLS 1322 | Basic MLS Hematology 1*, 2*† | | 4 |
| MLS 1330 | | | Basic MLS Immunochemistry*† | 2 |
| MLS 1331 | | | Basic MLS Clinical Immunology*† | 3 |
| MLS 1341 | | | Basic MLS Clinical Microbiology*† | 4 |
| MLS 1351 | | | Basic MLS Clinical Chemistry*† | 4 |
| MLS 1412 | | | MLT Special Topics* | 2 |
| MLS 1423 | | | MLT Hematology Applied Study* | 2 |
| MLS 1432 | | | Immunochemistry Applied Study* | 2 |
| MLS 1442 | | | MLT Microbiology Applied Study* | 2 |
| MLS 1452 | | | MLT Clinical Chemistry Applied Study* | 2 |
| MLS 1480 | | | MLT Seminar 1* | 2 |
| Electives | | | | |
| Computer science | | | | 3 |
| Humanities | | | | 6 |
| Social science | | | | 3 |
| Open electives | | | | 6 |
| Total Quarter Hours | | | | 104 |

*Tuition for this course is at a special rate.

†Or equivalent approved by Medical Laboratory Coordinator.

**Nursing
(Evening
Section)**

**Admission
Procedure**

**Planning a
Program of
Study**

**Nursing
(Evening
Section)
Bachelor of
Science in
Nursing
Degree
(Major
Code 809)**



The College of Nursing Bachelor of Science program, accredited by the National League for Nursing, is offered to registered nurses through

The following items are required for admission to this study option and should be forwarded to the Office of Academic and Student Affairs, University College, Northeastern University, 180 Ryder Hall, 360 Huntington Avenue, Boston, MA 02115:

- Completed Nursing Program application
- Official transcripts from basic nursing program
- Official transcripts from all colleges attended (if college courses were completed while attending a diploma program, an individual transcript from that college must be included.)

Potential students must plan their program of study with the Academic Coordinator. Appointments can be arranged by calling 617-437-2818.

Potential and current students are encouraged to attend group information sessions in order to increase their awareness of

University College. Every effort is made to assess prior learning, facilitate educational advancement, and provide flexible scheduling.

- Evidence of current licensure as a Registered Nurse
- Satisfactory performance on the NLN Mobility Profile II or ACT/PEP examinations.

Pre-admission and academic counseling are available by calling the Office of Academic and Student Affairs at 617-437-2400.

Prospective students may have a status report, detailing courses that are acceptable for transfer from other institutions as well as the remaining coursework to be completed by contacting the Office of Academic and Student Affairs 617-437-2400.

College of Nursing and University College policies. These sessions cover course requirements, promotional policies, advanced placement procedures, and the process of petitioning. To register for these sessions, call 617-437-2818.

| Core Courses | | | quarter hours | |
|--------------|----------|---|--------------------------------------|---|
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | 6 | |
| ENG 4112 | | Approaches to Literature | 3 | |
| BIO 4103 | BIO 4105 | Biology 1, 3 | 8 | |
| BIO 4175 | BIO 4176 | BIO 4177 | Human Anatomy and Physiology 1, 2, 3 | 9 |
| BIO 4190 | | Microbiology 1 | 3 | |
| CHM 4111 | CHM 4112 | CHM 4113 | General Chemistry 1, 2, 3 | 9 |
| NUR 4302 | | Pharmacodynamics | (3) | |
| or | | or | | |
| HSC 4601 | | Advanced Pharmacology | (3) | |
| PSY 4110 | | Introduction to Psychology: Fundamental Issues | 3 | |
| PSY 4111 | | Introduction to Psychology: Developmental Aspects | 3 | |
| PSY 4112 | | Introduction to Psychology: Personal Dynamics | 3 | |
| PSY 4240 | | Development: Infancy and Childhood | 3 | |
| PSY 4241 | | Development: Adolescence | 3 | |
| PSY 4242 | | Development: Adulthood and Aging | 3 | |
| PSY 4270 | PSY 4271 | Social Psychology 1, 2 | 6 | |
| SOA 4101 | | Cultural Anthropology: Kinship Societies | 3 | |

continued on next page

| | | |
|------------------------------------|--|----------------|
| SOA 4102 | Cultural Anthropology: State Societies | 3 |
| SOC 4100 | Roles, Culture, and the Individual | 3 |
| SOC 4101 | Inequality and Institutions | 3 |
| one history course of your choice | | 3 |
| Major Concentration Courses | | |
| NUR 4300 | Nursing Transition* | 9 |
| NUR 4301 | Psychiatric/Mental Health Nursing† | 7 |
| NUR 4400 | Maternal and Child Nursing† | 9 |
| NUR 4401 | Medical Surgical Nursing† | 9 |
| NUR 4500 | Community Health Nursing* | 9 |
| NUR 4501 | Contemporary Nursing* | 5 |
| NUR 4502 | Introduction to Nursing Research* | 4 |
| Electives | | |
| Humanities | | 9 |
| Open electives | | 15 |
| Total Quarter Hours | | 177-178 |

*Students must submit a petition to the Academic Coordinator to enter *each* nursing course. Petitions must be submitted at least one full quarter in advance of registering. Students petitioning to enter NUR 4300, Nursing Transition, must also obtain a health clearance from the Lane Health Center and present evidence of having had a tuberculin skin test within the previous twelve months. **Advanced standing credit of twenty-two quarter hours is awarded upon successful completion of this course.

†Challenge examinations are available for this course through the NLN Mobility Profile II Examination or the ACT-PEP Examination. Successful completion of either set of exams is a component of the admissions process.

Paramedic Technology

University College provides the opportunity to earn a certificate as well as an associate's degree in Paramedic Technology. Major concentration areas involve the EMT-Paramedic's roles, responsibilities and the subject areas required by Massachusetts Department of Public Health regulations and national guidelines. These areas include: medical terminology, patient assessment and initial management, airway and ventilation, pathophysiology of shock, general pharmacology, trauma and burns, respiratory system, cardiovascular system, endocrine emergencies, nervous system, acute abdomen, genitourinary and reproductive systems, anaphylaxis, toxicology, alcoholism and drug abuse, infectious diseases, environmental injuries, geriatrics, pediatrics, obstetrics, gynecological and neonatal emergencies, behavioral emergencies, EMS systems, medical/legal

considerations, communications, rescue, major incident response, and stress management.

Admissions requirements: completion and submission of an application form; high school diploma or equivalent; national, state or provincial certification as an Emergency Medical Technician; official high school or college transcripts; entrance examination; Admissions Committee interview; and physical examination.

Students who successfully complete the Paramedic Certificate Courses may continue with the liberal arts and computer courses necessary for an Associate in Science in Paramedic Technology Degree.

Whether or not students continue onto the associate level, all those certified in Paramedic Technology may apply for and take the National Registry of Emergency Medical Technicians Paramedic Certification Examination.

**Paramedic
Technology
Associate in
Science
Degree
(Major
Code 874)**



| Core Courses | | | quarter hours |
|-----------------------------------|----------|----------|--|
| EMS 4117 | EMS 4118 | EMS 4119 | Emergency Medical Services 1, 2, 3, 4 |
| EMS 4120 | | | 24 |
| EMS 4121 | EMS 4122 | | Emergency Medical Services 5, 6 |
| EMS 4123 | | | 22 |
| BIO 4178 | BIO 4179 | | Emergency Medical Service 7 |
| | | | 3 |
| | | | Human Anatomy and Physiology A and B |
| | | | 8 |
| Liberal Arts and Computer Courses | | | |
| ENG 4110 | ENG 4111 | | Critical Writing 1, 2 |
| | | | 6 |
| ENG 4112 | | | Approaches to Literature |
| | | | 3 |
| MTH 4110 | MTH 4111 | | Math 1, 2 |
| | | | 6 |
| SPC 4101 | | | Fundamentals of Human Communication |
| | | | 3 |
| PSY 4110 | | | Introduction to Psychology: Fundamental Issues |
| | | | 3 |
| PSY 4112 | | | Introduction to Psychology: Personal Dynamics |
| | | | 3 |
| HST 4103 | | | Civilization of Modern World |
| | | | 3 |
| LNS 4101 | LNS 4102 | | Beginning Conversational Spanish 1, 2 |
| | | | 8 |
| COM 4101 | | | Foundations of Computer Literacy |
| | | | 4 |
| Total Quarter Hours | | | 96 |

**Radiologic
Technology**

The Radiologic Technology program is a joint offering of the University and several area hospitals. Classroom experience is provided by the University, and the laboratory practicum is conducted at an assigned affiliated hospital. The program is accredited by the Council on Medical Education of the American Medical Association.

The Radiologic Technologist is a skilled professional employed in the diagnostic and therapeutic areas of the hospital, as well as in industrial production, quality control, and inspection laboratories. The Radiologic Technologist utilizes man-made x-radiation to produce images of the human body that aid in the diagnosis and interpretation of disease. Students in the Radiography program gain exposure in advanced imaging and therapeutic areas such as computerized tomography, magnetic resonance imaging, ultrasonography, nuclear medicine, and radiation

therapy. Each of the three associate of science degree options provides graduates with full tracking into bachelor of science degree programs in health science or health management through University College. Bachelor degree courses may be taken on a full or part-time basis and are designed to assist graduates in their career growth as health managers, health educators and advanced imaging specialists.

Prerequisite: Satisfactory completion of three years of high school math (*Algebra 1* and *2* and geometry), one year of biology, and one year of chemistry or physics. Applicants must also satisfactorily complete the Scholastic Aptitude Test (SAT) and submit one letter of recommendation from a science instructor. In addition, applicants must satisfy general University requirements. Candidates who successfully meet the above requirements may then schedule an interview with the Radiologic Technology Program Director.

**Associate in
Science
Degree Full-
Time Day
Program
(806)**

The associate in science degree program is a full-time day program. Graduates are eligible to take the examination for certification by the American Registry of Radiologic Technologists. The full-time day curriculum is scheduled over twenty-seven months with early exit options

available for students with transfer credit or students who wish to take an accelerated course sequence. Early exit provides graduates with the opportunity to enter the job market and/or begin work on their bachelor degree studies.

**Associate in
Science
Degree Part-
Time Evening
Program
(811)**

A part-time evening option exists for students unable to participate in the full-time day program. Required academic classes are scheduled during the evening over twenty-four consecutive months. Following the

academic courses, the student will complete the program requirements by participating in up to one year of full-time clinical experience in an assigned hospital setting.

**Part-Time
Evening
Program for
Radiographers
(810)**

University College also offers an associate of science degree program for registered technologists; the program requires fewer major concentration courses.

Candidates who wish to apply to this

program must document satisfactory completion of an accredited certificate program in radiologic technology or be certified by the American Registry of Radiologic Technologists.

**Radiologic
Technology
Associate in
Science
Degree
(Major Codes
806/811)**



| Core Courses | | | | quarter hours |
|-----------------------------|----------|----------|---|---------------|
| BIO 4103 | | | Biology 1 | 4 |
| BIO 4175 | BIO 4176 | BIO 4177 | Human Anatomy and Physiology 1, 2, 3 | 9 |
| COM 4101 | | | Foundations of Computer Literacy | 4 |
| ENG 4110 | ENG 4111 | | Critical Writing 1, 2 | 6 |
| ENG 4112 | | | Approaches to Literature | 3 |
| HMG 4100 | | | Hospital Organization and Management 1 | 3 |
| MTH 4110 | MTH 4111 | | Math 1, 2 | 6 |
| PSY 4110 | | | Introduction to Psychology Fundamental Issues | 3 |
| Major Concentration Courses | | | | |
| RAD 4100 | RAD 4101 | | Radiologic Technology Orientation 1, 2 | 6 |
| RAD 4102 | RAD 4103 | | Radiologic Science 1, 2 | 8 |
| RAD 4104 | RAD 4105 | | Principles of Radiology 1, 2 | 8 |
| RAD 4106 | RAD 4107 | | Radiologic Photography and Exposure 1, 2 | 8 |
| RAD 4116 | RAD 4117 | RAD 4118 | Radiology Practicum 1, 2, 3, 4 | 16 |
| RAD 4119 | | | | |
| RAD 4121 | RAD 4122 | | Principles of Photography and Exposure Lab 1, 2 | 2 |
| RAD 4304 | | | Cross-Sectional Anatomy | 4 |
| RAD 4305 | | | Advanced Radiologic Technology 1 | 4 |
| RAD 4306 | | | Radiation Protection—Radiobiology | 4 |
| Total Quarter Hours | | | | 98 |

**Part-Time
Associate in
Science
Degree
Program for
Radiographers
(Major Code
810)**



| Core Courses | | quarter hours |
|---|---|-----------------------|
| Transfer credit for completion of prerequisite* | | 50 |
| BIO 4103 | Biology 1 | 4 |
| COM 4101 | Foundations of Computer Literacy | 4 |
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 |
| ENG 4112 | Approaches to Literature | 3 |
| HMG 4100 | Hospital Organization and Management | 3 |
| MTH 4110 | MTH 4111- | Math 1, 2 |
| PSY 4110 | Introduction to Psychology: Fundamental Issues | (3) |
| or | or | |
| SOC 4100 | Roles, Culture, and the Individual | (3) |
| PSY 4111 | Introduction to Psychology: Developmental Aspects | (3) |
| or | or | |
| SOC 4101 | Inequality and Institutions | (3) |
| Major Concentration Courses | | |
| RAD 4300 | Advanced Radiologic Technology 1 | 4 |
| RAD 4303 | Radiation Protection—Radiobiology | 3 |
| RAD 4304 | Cross-Sectional Anatomy | 4 |
| RAD 4460 | Medical Imaging Quality Assurance | 3 |
| Total Quarter Hours | | 96 |

*Prerequisite: Satisfactory completion of a certificate program in radiologic technology or registration by the American Registry of Radiologic Technologists.

**Therapeutic
Recreation
Services**

Therapeutic recreation is the use of leisure services to improve or maintain physical, mental, emotional, and/or social functioning; and to assist individuals in achieving independent lifestyles. Comprehensive therapeutic recreation services involve a continuum of care, including

- treatment that uses leisure activities to remediate or rehabilitate functional abilities and to assist in diagnosis;
- leisure education that uses activities to acquire skills, knowledge, and attitudes that facilitate an independent lifestyle and avocational competence; and
- recreation that uses activities to enhance health, growth, development, and independence.

This comprehensive approach uses the needs, interests, and abilities of the client, as well as the mandate of the service agency, to direct the therapeutic recreation services provided.

The Therapeutic Recreation Certificate verifies that a basic level of competence in this field has been attained. The Massachusetts Recreation and Park Association recognizes both the certificate and associate's degree programs in its professional registration plan. The associate's degree program leads to a paraprofessional classification with the National Council for Therapeutic Recreation Certification.

Students in the certificate and associate's degree programs may go on to pursue the bachelor of science degree in Health Science, Health Management or Sociology in University College, or the bachelor of science in Therapeutic Recreation degree in the undergraduate day program of Northeastern University's Department of Health, Sport, and Leisure Studies.

For further information contact Dr. George Ransom at (617) 437-3167 or (617) 437-3153.

**Therapeutic
Recreation
Services
Activity
Leader
Certificate
Program
(Major
Code 601)**



| Core Courses | | | | quarter hours |
|---|----------|----------|--|---------------|
| ENG 4110 | | | Critical Writing 1 | 3 |
| Major Concentration Courses | | | | |
| REC 4101 | REC 4102 | REC 4103 | Principles and Practices of Therapeutic Recreation 1, 2, 3 | 9 |
| REC 4110 | REC 4111 | | Group Dynamics and Leadership 1, 2 | 6 |
| REC 4403 | | | Concept of Leisure | 3 |
| REC 4500 | REC 4501 | | Clinical Internship 1, 2* | 8 |
| Electives | | | | |
| <i>Choose six quarter hours from the following:</i> | | | | |
| REC 4300 | REC 4301 | | Arts and Crafts 1, 2 | (6) |
| REC 4310 | | | Social Recreation | (3) |
| REC 4311 | REC 4314 | | Therapeutic Use of Music 1, 2 | (6) |
| <i>Choose six quarter hours from the following:</i> | | | | |
| REC 4200 | | | Introduction to Learning Disabilities | (3) |
| REC 4210 | | | Psychosocial Aspects of Disabilities and Illness | (3) |
| REC 4250 | | | Assessment of Learning Disabilities | (3) |
| REC 4304 | | | Dynamics of Family Life for the Disabled | (3) |
| REC 4350 | | | Legal Issues of Disability and Rehabilitation | (3) |
| REC 4401 | | | The Nursing Home Experience | (3) |
| REC 4425 | | | Mental Illness and Retardation | (3) |
| REC 4450 | | | Vocational Planning for the Learning Disabled | (3) |
| REC 4460 | | | The Process of Aging | (3) |
| REC 4462 | | | Leisure Counseling | (3) |
| REC 4470 | | | The Learning Disabled at Work | (3) |
| Total Quarter Hours | | | | 38 |

*See course description for prerequisites; eligibility is determined by the program consultant. Petitions can be obtained in the Health Professions Program office and should be filed at least one quarter in advance of the start of the practicum.

**Therapeutic
Recreation
Services
Associate in
Science
Degree
(Major
Code 600)**



| Core Courses | | | | quarter hours |
|-----------------------------|----------|----------|--|---------------|
| BIO 4103 | BIO 4104 | | Biology 1, 2 | 8 |
| BIO 4175 | BIO 4176 | BIO 4177 | Human Anatomy and Physiology 1, 2, 3 | 9 |
| ENG 4110 | ENG 4111 | | Critical Writing 1, 2 | 6 |
| ENG 4112 | | | Approaches to Literature | 3 |
| HSC 4301 | HSC 4302 | | Pathophysiology 1, 2 | 6 |
| PSY 4110 | | | Introduction to Psychology: Fundamental Issues | 3 |
| PSY 4111 | | | Introduction to Psychology: Developmental Aspects | 3 |
| PSY 4112 | | | Introduction to Psychology: Personal Dynamics | 3 |
| Major Concentration Courses | | | | |
| REC 4101 | REC 4102 | REC 4103 | Principles and Practices of Therapeutic Recreation 1, 2, 3 | 9 |
| REC 4110 | REC 4111 | | Group Dynamics and Leadership 1, 2 | 6 |
| REC 4210 | | | Psychosocial Aspects of Disability and Illness | 3 |
| REC 4300 | REC 4301 | | Arts and Crafts 1, 2 | 6 |
| REC 4310 | | | Social Recreation | 3 |
| REC 4425 | | | Mental Illness and Retardation | 3 |
| REC 4500 | REC 4501 | | Clinical Internship 1, 2* | 8 |

continued on next page

Electives

Choose 24 quarter hours from the following:

| | | | |
|----------|----------|--|-----|
| REC 4105 | | Childhood Medical Procedures | (2) |
| REC 4118 | | Coping Skills for Child Rearing | (2) |
| REC 4200 | | Introduction to Learning Disabilities | (3) |
| REC 4210 | | Psychosocial Aspects of Disabilities and Illness | (3) |
| REC 4215 | | Causes/Detection of Child Abuse | (3) |
| REC 4250 | | Assessment of Learning Disabilities | (3) |
| REC 4304 | | Dynamics of Family Life for the Disabled | (3) |
| REC 4311 | REC 4314 | Therapeutic Use of Music 1, 2 | (6) |
| REC 4350 | | Legal Issues of Disability and Rehabilitation | (3) |
| REC 4378 | REC 4379 | Parenting Skills 1, 2 | (6) |
| or | | or | |
| REC 4380 | | Parenting Skills Intensive | (6) |
| REC 4401 | | The Nursing Home Experience | (3) |
| REC 4402 | | Leisure and Lifestyle | (3) |
| REC 4403 | | Concepts of Leisure: Sociopsychological Perspectives | (3) |
| REC 4405 | | Management in Mentally Handicapped Residences | (3) |
| REC 4425 | | Mental Illness and Retardation | (3) |
| REC 4450 | | Vocational Planning for the Learning Disabled | (3) |
| REC 4460 | | The Process of Aging | (3) |
| REC 4462 | | Leisure Counseling | (3) |
| REC 4470 | | The Learning Disabled at Work | (3) |

Total Quarter Hours

103

*See course description for prerequisites; eligibility is determined by the program consultant. Petitions can be obtained in the Health Professions Program office and should be filed at least one quarter in advance of the start of the practicum.

Liberal Arts Degree Programs

Diane Wald, *Director, Liberal Arts Programs*

Nancy Bandoian, *Assistant to the Director, Liberal Arts Programs*

266 Ryder Hall

617-437-2416, 437-2423

Program Consultants and Advisors

ART: Arts and Graphics

Consultant:

Prof. Peter Serenyi, Chair, Dept. of Art & Architecture (College of Arts and Sciences) (617-437-2347)

Associate Consultant and Program Advisor:

Dr. Frank Trocki
(617-437-2390)

ASL: American Sign Language

Consultant and Program Advisor:

Nancy V. Becker, Coordinator, Educational Services, ASL Program (College of Arts and Sciences) (voice 617-437-3064; TTY 617-437-3067)

DRA: Drama

Consultant:

Prof. Mort S. Kaplan, Theatre and Dance Dept. (College of Arts and Sciences) (617-437-4152)

ECN: Economics

Consultant:

Prof. M. A. Horowitz, Chair, Economics Dept. (College of Arts and Sciences) (617-437-2882)

Associate Consultant:

Prof. H. Goldstein, Executive Officer, Economics Dept. (College of Arts and Sciences) (617-437-2882)

Assistant Consultant/Program Advisor:

Dr. Herbert J. Eskot (617-437-2416, 437-2423)

ENG: English (Literature or Writing)

Consultant:

Prof. M. X. Lesser, English Dept. (College of Arts and Sciences) (617-437-2512)

HST: History

Consultant:

Prof. Raymond H. Robinson, Chair, History Dept. (College of Arts and Sciences) (617-437-2660)

Associate Consultant/Program Advisor:

Prof. Gerald H. Herman, History Dept. (College of Arts and Sciences) (617-437-2660)

JRN: Journalism, Public Relations, and Advertising

Consultant and Program Advisor:

Prof. Larue W. Gilleland, Chair, Journalism Dept. (College of Arts and Sciences) (617-437-3236)

LN: Modern Languages

Consultant:

Prof. Holbrook Robinson, Chair, Modern Languages Dept. (College of Arts and Sciences) (617-437-2234)

Modern Languages includes the following:

LNA: Arabic LNJ: Japanese

LNF: French LNL: Latin

LNG: German LNN: Swedish

LNH: Hebrew LNR: Russian

LNI: Italian LNS: Spanish

MUS: Music

Consultant:

Prof. Joshua R. Jacobson, Chair, Music Dept. (College of Arts and Sciences) (617-437-2440)

Associate Consultant/Program Advisor:

Jeanne Segal, Music Dept. (College of Arts and Sciences) (617-437-2440)

PHL: Philosophy and Religion

Consultant:

Prof. Susan Setta, Philosophy Dept. (College of Arts and Sciences) (617-437-3636)

POL: Political Science

Consultant:

Prof. L. Gerald Bursey, Political Science Dept. (College of Arts and Sciences) (617-437-2796)

Program Advisor:

Prof. Robert Gilbert, Chair, Political Science Dept. (College of Arts and Sciences) (617-437-2796)

PSY: Psychology

Consultant/Program Advisor:

Prof. Charles Karis, Psychology Dept. (College of Arts and Sciences) (617-437-3076)

Associate Consultant:
Prof. Harold Zamansky, Psychology
Dept. (College of Arts and Sciences)
(617-437-3076)

**SOA: Sociology-Anthropology, and SOC:
Sociology**

Consultant:
Prof. Christine Gailey, Sociology Dept.
(College of Arts and Sciences)
(617-437-2686)

Associate Consultant/Program Advisor:
Prof. Elliott Krause, Sociology Dept.

(College of Arts and Sciences)
(617-437-2686)

SPC: Speech Communication

Consultant/Program Advisor:
TBA (Call Liberal Arts Program Office
617-437-2416)

TCC: Technical Communications

Consultant/Program Advisor:
Neil F. Duane (President, Boston
Documentation Design) (617-965-5300)

Purpose

Through the liberal arts curricula offered by University College, students are guided in their independent and creative discovery of ideas and methods in the areas of humanities, natural sciences, and social sciences.

University College holds that a liberal arts education enables students to make more intelligent and realistic appraisals of self and career. The

Liberal Arts Programs at the college present students with both a challenge to bring meaning and focus to the educational experience and an opportunity to acquire marketable knowledge and skills. As the president of a large corporation put it, "It is no longer enough for management to be well-trained rather than well-educated."

Programs

University College offers bachelor of arts and bachelor of science degrees in art, economics, English, history, political science, psychology, and sociology-anthropology. Unlike the bachelor of science degree, the bachelor of arts degree includes a language requirement. Bachelor of science degrees are offered in graphic design and visual communication, and technical communications; the technical communications degree

includes a professional experience opportunity. In addition, degree programs in English, political science, and sociology-anthropology present professional concentrations designed to teach specialized skills.

Liberal Arts bachelor's degree candidates are permitted to accumulate up to 44 quarter hours of "open elective" credit (25 percent of the credits toward a bachelor's degree) in business subjects.

Bachelor's Degree in Liberal Studies

University College offers a bachelor of arts degree in liberal studies designed to help students develop communication, analytical, and research skills while exploring the great ideas of the ages as well as contemporary issues. The program's courses are grouped in four areas:

- Communication and Critical Thinking
- Cultural Heritage
- Science, Research, and Quantitative Methods
- Contemporary Studies.

The courses in each area are selected to provide students with a breadth of disciplinary perspectives.

Forty-five quarter hours of elective credits are awarded to allow students to take a certificate program or select individual courses in accordance with their personal and career interests.

Upon approaching completion of individual course work in Cultural Heritage and Contemporary Studies, students take an interdisciplinary seminar in each area to integrate their learning experiences.

Bachelor's Degree in Graphic Design and Visual Communication

In response to the rising demand for professional training in the field of visual communications, University College has introduced a bachelor of science degree program in graphic design and visual communication.

The program has a unique, three-tiered structure that enables students to begin with the certificate program, continue through the associate's program, and finish with the bachelor's program.

Associate in Science Degree

An associate in science degree program in arts and sciences is offered for those who want a general background in liberal arts, but

who do not want to pursue a major field of concentration for the bachelor's degree.

Certificate Programs

Students who seek specialized skills to advance their careers may choose from the following liberal arts certificate programs, which they may take independently or in conjunction with degree study:

- acting
- advertising
- American Sign Language and deaf studies

- American Sign Language-English interpreting
- business communication
- computer graphic design
- graphic design and visual communication
- public relations
- speech communication
- technical writing
- writing.

Special Studies

University College offers a variety of Special Studies. These courses give students an opportunity to earn credits in Advanced Tutorials, Independent

Studies, Honors Programs, and Field Work. Consult descriptions on pages 20-21.

Assessment of Prior Learning Program (APL)

Some students may petition for prior learning credit, which is available *only for liberal arts courses*. See page 24 for details.

Prior learning credit is not available for business courses except through

CLEP or PEP examinations. See Credit by Examination, page 23.

Credit cannot be awarded through APL when an appropriate examination is available through CLEP or PEP.

Arts and Sciences Associate in Science Degree (Major Code 372)

| Core Courses | | | quarter hours |
|--|----------|--------------------------|---------------|
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | 6 |
| ENG 4112 | | Approaches to Literature | 3 |
| Major Concentration Courses | | | |
| Humanities (ART, ASL, DRA, ENG, JRN, LN, MUS, PHL, SPC, TCC) | | | 24 |
| Math-Science (BIO, CHM, ESC, MTH, PHY) | | | 18 |
| Social Sciences (ECN, HST, POL, PSY, SOA, SOC) | | | 24 |
| Electives | | | 21 |
| Total Quarter Hours | | | 96 |



**Economics
Bachelor of
Arts Degree
(Major Code
390)**



| Core Courses | | | quarter hours |
|--|----------|------------------------------|--|
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | 6 |
| ENG 4112 | | Approaches to Literature | 3 |
| MTH 4110 | MTH 4111 | Math 1, 2 | 6 |
| Modern Language | | Elementary or Conversational | 12 |
| | | Intermediate | 12 |
| Humanities (ART, ASL, DRA, ENG, JRN, LN, MUS, PHL, SPC, TCC) | | | 24 |
| Math-Science (BIO, CHM, ESC, MTH, PHY) | | | 12 |
| Social Sciences (HST, POL, PSY, SOA, SOC) | | | 18 |
| Major Concentration Courses | | | |
| ECN 4115 | ECN 4116 | ECN 4117 | Economic Principles and Problems 1,2,3 9 |
| ECN 4215 | | | Macroeconomic Theory 3 |
| ECN 4216 | | | Microeconomic Theory 3 |
| ECN 4250 | ECN 4251 | ECN 4252 | Statistics 1, 2, 3 9 |
| ECN 4310 | | | Labor Economics 3 |
| ECN 4342 | ECN 4343 | | Money and Banking 1, 2 6 |
| ECN 4344 | | | Government Finance 3 |
| Electives | | | |
| Economics | | | 21 |
| Open electives | | | 24 |
| Total Quarter Hours | | | 174 |

**Economics
Bachelor of
Science
Degree with
Certificate in
Finance
(Major
Code 390)**



| Core Courses | | | quarter hours |
|---|----------|--------------------------|--|
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | 6 |
| ENG 4112 | | Approaches to Literature | 3 |
| MTH 4110 | MTH 4111 | Math 1, 2 | 6 |
| Social Sciences (HST, POL, PSY, SOA, SOC) | | | 12 |
| Major Concentration Courses | | | |
| ECN 4115 | ECN 4116 | ECN 4117 | Economic Principles and Problems 1,2,3 9 |
| ECN 4215 | | | Macroeconomic Theory 3 |
| ECN 4216 | | | Microeconomic Theory 3 |
| ECN 4250 | ECN 4251 | ECN 4252 | Statistics 1, 2, 3 9 |
| ECN 4310 | | | Labor Economics 3 |
| ECN 4342 | ECN 4343 | | Money and Banking 1, 2 6 |
| ECN 4344 | | | Government Finance 3 |
| Finance Certificate Courses | | | |
| ACC 4101 | ACC 4102 | ACC 4103 | Accounting Principles 1, 2, 3 9 |
| FI 4301 | | | Principles of Finance 3 |
| FI 4302 | | | Financial Management 3 |
| FI 4310 | | | Investment Principles 3 |
| FI 4320 | | | Credit Principles 3 |
| FI 4325 | | | Budgeting and Planning 3 |
| Electives | | | |
| Economics | | | 21 |
| Liberal Arts | | | 42 |
| Open electives | | | 24 |
| Total Quarter Hours | | | 174 |

**English
Bachelor of
Arts Degree
(Major
Code 330)**



| Core Courses | | | quarter hours |
|--|----------|------------------------------|---------------|
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | 6 |
| ENG 4112 | | Approaches to Literature | 3 |
| Modern Language | | Elementary or Conversational | 12 |
| | | Intermediate | 12 |
| Math-Science (BIO, CHM, ESC, MTH, PHY) | | | 18 |
| Social Sciences (ECN, HST, POL, PSY, SOA, SOC) | | | 24 |

Major Concentration Courses

| | | | |
|-----------|----------|---|---|
| ENG 4120 | | English Literature: Faith and Humanism | 3 |
| ENG 4121 | | English Literature: Reason and Romanticism | 3 |
| ENG 4122 | | English Literature: Victorians and Moderns | 3 |
| ENG 4123 | | Early American Literature: Faith, Reason, and Nature | 3 |
| ENG 4124 | | American Romantics and American Realists | 3 |
| ENG 4125 | | American Literature: The Modern Temper | 3 |
| ENG 4131 | | God, Gods, and Heroes: The Literature of the Ancient and Medieval Worlds | 3 |
| ENG 4132 | | Man, Reason, and Imagination: Literature from the Renaissance to the Romantic Age | 3 |
| ENG 4133 | | Order and Disorder: Literature of the Moderns | 3 |
| ENG 4349 | ENG 4350 | Expository and Persuasive Writing 1, 2 | 6 |
| ENG 4352 | | Expository Communications | 3 |
| ENG 4604* | | Major Figures in Literature | 6 |
| ENG 4658 | | Shakespeare the Dramatist | 3 |

Choose one of two concentrations for twenty-seven quarter hours:

I. Literature

Select nine courses from the ENG 4200 or ENG 4600 series in the course descriptions on pages 166-169. (27)

II. Writing

Choose six courses from the ENG 4300 or ENG 4500 series in the course descriptions on pages 167-168, and three courses from either the JRN or TCC courses on pages 190-191 and 242-244. (27)

Electives

| | |
|----------------|----|
| English | 9 |
| Open electives | 18 |

Total Quarter Hours **174**

*Course must be taken twice, focusing on a different figure each time.

**English
Bachelor of
Science
Degree
(Major
Code 330)**



| Core Courses | | | quarter hours |
|--|----------|--------------------------|---------------|
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | 6 |
| ENG 4112 | | Approaches to Literature | 3 |
| Math-Science (BIO, CHM, ESC, MTH, PHY) | | | 18 |
| Social Sciences (ECN, HST, POL, PSY, SOA, SOC) | | | 24 |

Major Concentration Courses

| | | | |
|----------|--|--|---|
| ENG 4120 | | English Literature: Faith and Humanism | 3 |
| ENG 4121 | | English Literature: Reason and Romanticism | 3 |
| ENG 4122 | | English Literature: Victorians and Moderns | 3 |

continued on next page

| | | | |
|-----------|---|--|---|
| ENG 4123 | Early American Literature: Faith, Reason, and Nature | 3 | |
| ENG 4124 | American Romantics and American Realists | 3 | |
| ENG 4125 | American Literature: The Modern Temper | 3 | |
| ENG 4131 | God, Gods, and Heroes: The Literature of the Ancient and Medieval Worlds | 3 | |
| ENG 4132 | Man, Reason, and Imagination: Literature from the Renaissance to the Romantic Age | 3 | |
| ENG 4133 | Order and Disorder: Literature of the Moderns | 3 | |
| ENG 4349 | ENG 4350 | Expository and Persuasive Writing 1, 2 | 6 |
| ENG 4352 | | Expository Communications | 3 |
| ENG 4604* | | Major Figures in Literature | 6 |
| ENG 4658 | | Shakespeare the Dramatist | 3 |

Choose one of two concentrations for twenty-seven quarter hours:

I. Literature

Choose nine courses from the ENG 4200 or ENG 4600 series in the course descriptions on pages 166-169. (27)

II. Writing

Select six courses from the ENG 4300 or ENG 4500 series in the course descriptions on pages 167-168, and three courses from either the JRN or TCC courses on pages 190-191 and 242-244. (27)

Electives

| | |
|---------|---|
| English | 9 |
|---------|---|

| | |
|----------------|----|
| Open electives | 42 |
|----------------|----|

| | |
|----------------------------|------------|
| Total Quarter Hours | 174 |
|----------------------------|------------|

*Course must be taken twice, focusing on a different figure each time.

Fine Arts Bachelor of Arts Degree (Major Code 327)



| Core Courses | | quarter hours | |
|--|----------|------------------------------|----|
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | 6 |
| ENG 4112 | | Approaches to Literature | 3 |
| Modern Language | | Elementary or Conversational | 12 |
| | | Intermediate | 12 |
| Math-Science (BIO, CHM, ESC, MTH, PHY) | | | 18 |
| Social Sciences (ECN, HST, POL, PSY, SOA, SOC) | | | 24 |

Major Concentration Courses

| | | |
|-----------|---|---|
| ART 4100 | History of Art | 3 |
| ART 4101 | History of Art to the Sixteenth Century | 3 |
| ART 4102 | History of Art to the Twentieth Century | 3 |
| ART 4106 | Introduction to Art | 3 |
| ART 4112* | Visual Foundations | 3 |

Electives

| | |
|-----|----|
| Art | 36 |
|-----|----|

| | |
|------------------|----|
| Open electives** | 48 |
|------------------|----|

| | |
|----------------------------|------------|
| Total Quarter Hours | 174 |
|----------------------------|------------|

*3 1/2-hour studio.

**Up to 44 q.h. allowed in business subjects.

**Fine Arts
Bachelor of
Science
Degree
(Major Code
327)**



| Core Courses | | | quarter hours |
|--|----------|---|---------------|
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | 6 |
| ENG 4112 | | Approaches to Literature | 3 |
| Math-Science (BIO, CHM, ESC, MTH, PHY) | | | 18 |
| Social Sciences (ECN, HST, POL, PSY, SOA, SOC) | | | 24 |
| Major Concentration Courses | | | |
| ART 4100 | | History of Art | 3 |
| ART 4101 | | History of Art to the Sixteenth Century | 3 |
| ART 4102 | | History of Art to the Twentieth Century | 3 |
| ART 4106 | | Introduction to Art | 3 |
| ART 4112* | | Visual Foundations | 3 |
| Electives | | | |
| Art | | | 36 |
| Open electives** | | | 72 |
| Total Quarter Hours | | | 174 |

*3 1/2-hour studio.

**Up to 44 q.h. allowed in business subjects.

**Graphic
Design and
Visual
Communica-
tion Associate
in Science
Degree (Major
Code 362)**



| Core Courses | | | quarter hours |
|--|----------|---|---------------|
| Communication | | | |
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | 6 |
| ENG 4112 | | Approaches to Literature | 3 |
| PHL 4100 | | Philosophical Thinking | 3 |
| SPC 4101 | | Fundamentals of Human Communication | 3 |
| Social Sciences | | | |
| HST 4101 | | The Civilization of the Ancient and Medieval Worlds | 3 |
| HST 4102 | | The Civilization of the Early Modern World | 3 |
| HST 4103 | | The Civilization of the Modern World | 3 |
| SOC 4100 | | Roles, Culture, and the Individual | 3 |
| SOC 4101 | | Inequality and Institutions | 3 |
| Business | | | |
| MGT 4101 | | Introduction to Business and Management 1 | 3 |
| MKT 4301 | | Introduction to Marketing 1 | 3 |
| ACC 4101 | | Accounting Principles 1 | 3 |
| Major Concentration Courses | | | |
| Art/Graphics | | | |
| ART 4105 | | Art through the Ages | 3 |
| ART 4110 | | Modern Art | 3 |
| ART 4121* | | Principles of Drawing and Composition | 3 |
| ART 4112* | | Visual Foundations | 3 |
| ART 4175 | | History of Graphic Design | 3 |
| Graphic Design and Communication Certificate | | | |
| ART 4135* | | Design Foundations and Techniques | 3 |
| ART 4139 | | Color Theory and Practice | 3 |
| ART 4140 | | Graphic Communication and Production | 3 |

continued on next page

Graphic Design and Visual Communication Bachelor of Science Degree (Major Code 360)



| | | | |
|----------------------------------|-----------|-------------------------|-----------|
| ART 4141* | ART 4142* | Graphic Design 1, 2 | 6 |
| ART 4143* | | Advertising Design | 3 |
| ART 4151 | | Typography | 3 |
| ART 4251* | | Advanced Graphic Design | 3 |
| ART 4367 | | Illustration | 3 |
| JRN 4349 | * | Advertising Basics | 3 |
| Additional courses in humanities | | | 12 |
| Total Quarter Hours | | | 96 |

*3 1/2-hour studio.

| Core Courses | quarter hours |
|--|----------------------|
| Credits from associate in science degree in graphic design and communication | 96 |

Business Communication and Research

| | | | |
|----------|----------|---|---|
| ENG 4380 | ENG 4381 | Business Writing and Reports 1, 2 | 6 |
| SPC 4251 | | Business and Professional Speaking | 3 |
| ECN 4115 | | Economic Principles and Problems 1 | 3 |
| MGT 4330 | | Essentials for Managers of Small Businesses | 3 |

Computer, Math, Science

| | | | |
|----------|----------|----------------------------------|--------------|
| COM 4101 | | Foundations of Computer Literacy | 4 |
| MTH 4110 | MTH 4111 | MTH 4112 | Math 1, 2, 3 |

Choose one of the following pairs:

| | | | |
|----------|----------|---|-----|
| BIO 4103 | BIO 4104 | Biology 1, 2 | (6) |
| or | | or | |
| CHM 4111 | CHM 4112 | General Chemistry 1, 2 | (6) |
| or | | or | |
| ESC 4103 | | Introduction to Earth Sciences: The Solid Earth | (3) |
| ESC 4104 | | Introduction to Earth Sciences: The Fluid Earth | (3) |
| or | | or | |
| PHY 4101 | PHY 4102 | College Physics 1, 2** | (8) |

Major Concentration Courses

| | | |
|-----------|---|---|
| ART 4160* | Basic Photography | 3 |
| ART 4176 | International Directions in Graphic Design | 3 |
| ART 4181* | Introduction to Computer-Aided Graphic Design | 3 |
| ART 4182* | Computer-Aided Graphic Design Workshop | 3 |
| ART 4183* | Electronic Publishing Design | 3 |
| ART 4366 | Promotional and Technical Publications: Design and Production | 3 |
| ART 4368 | Graphic Design for Media | 3 |
| ART 4500 | Senior Project | 3 |
| ART 4501 | Portfolio Development | 3 |

| | |
|--------------------|-----------|
| Electives** | 18 |
|--------------------|-----------|

| | |
|----------------------------|----------------|
| Total Quarter Hours | 175-177 |
|----------------------------|----------------|

*3 1/2-hour studio or lab.

**Physics and additional courses in humanities are recommended.

History
Bachelor of
Arts Degree
(Major Code
323)



| Core Courses | | | quarter hours |
|--|----------|---|---------------|
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | 6 |
| ENG 4112 | | Approaches to Literature | 3 |
| Modern Language | | Elementary or Conversational | 12 |
| | | Intermediate | 12 |
| Humanities (ART, ASL, DRA, ENG, JRN, LN, MUS, PHL, SPC, TCC) | | | 24 |
| Math-Science (BIO, CHM, ESC, MTH, PHY) | | | 18 |
| Social Sciences (in three of the following areas: ECN, POL, PSY, SOA, SOC) | | | 18 |
| Major Concentration Courses | | | |
| Introductory Courses | | | |
| HST 4101 | | The Civilization of the Ancient and Medieval Worlds | 3 |
| HST 4102 | | The Civilization of the Early Modern World | 3 |
| HST 4103 | | The Civilization of the Modern World | 3 |
| HST 4201 | | American History 1763-1848 | 3 |
| HST 4202 | | American History 1848-1917 | 3 |
| HST 4203 | | American History Since 1917 | 3 |
| Historical Skill Requirement | | | |
| HST 4241 | | The Historian's Craft | 3 |
| HST 4265 | | Introduction to Public History | 3 |
| Regional Distribution | | | |
| <i>Choose one course from each of the following three regional groupings:</i> | | | |
| European: any course with a HST 44 prefix | | | 3 |
| American: any course with a HST 45 prefix | | | 3 |
| Other: any course with a HST 46 prefix | | | 3 |
| Thematic Distribution | | | |
| <i>Choose four courses from one of the following groups A-E, or choose Group F:</i> | | | |
| Group A: America's Ethnic Roots (HST 4404, 4434, 4435, 4455, 4466, 4467, 4501, 4543, 4602, 4604, 4611, 4632, 4636) | | | (12) |
| Group B: America's Social and Economic History (HST 4530, 4540, 4542, 4546, 4547, 4548) | | | (12) |
| Group C: Contemporary History (HST 4424, 4425, 4460, 4468, 4469, 4513, 4549, 4602, 4603, 4611, 4622, 4644, 4645, 4646) | | | (12) |
| Group D: Technological History (HST 4301, 4302, 4303, 4304, 4305) | | | (12) |
| Group E: Women and Family History (HST 4434, 4435, 4540, 4542, 4640, 4641) | | | (12) |
| Group F: Honors (HST 4811, 4812, 4813) | | | (12) |
| Electives | | | 36 |
| Total Quarter Hours | | | 174 |

History
Bachelor of
Science
Degree
(Major Code
323)



| Core Courses | | | | quarter hours |
|--|----------|----------|--|---------------|
| ENG 4110 | ENG 4111 | | Critical Writing 1, 2 | 6 |
| ENG 4112 | | | Approaches to Literature | 3 |
| MIS 4101 | MIS 4102 | | Introduction to Data Processing and Information Systems 1, 2 | 6 |
| SOC 4331 | SOC 4332 | SOC 4333 | Social Research Methods 1, 2, 3 | 9 |
| Humanities (ART, ASL, DRA, ENG, JRN, LN, MUS, PHL, SPC, TCC) | | | | 24 |
| Social Sciences | | | | |
| <i>Choose two sequences of three courses from the following:</i> | | | | |
| ECN 4115 | ECN 4116 | ECN 4117 | Economic Principles and Problems 1,2,3 | (9) |
| POL 4103 | | | Introduction to Politics | (3) |
| POL 4104 | | | Introduction to American Government | (3) |
| POL 4105 | | | Introduction to Comparative Politics | (3) |

continued on next page

| | | |
|----------|---|-----|
| PSY 4110 | Introduction to Psychology: Fundamental Issues | (3) |
| PSY 4111 | Introduction to Psychology: Developmental Aspects | (3) |
| PSY 4112 | Introduction to Psychology: Personal Dynamics | (3) |
| SOA 4100 | Physical Anthropology | (3) |
| SOA 4101 | Cultural Anthropology: Kinship Societies | (3) |
| SOA 4102 | Cultural Anthropology: State Societies | (3) |
| SOC 4100 | Roles, Culture, and the Individual | (3) |
| SOC 4101 | Inequality and Institutions | (3) |
| SOC 4102 | Institutions and Social Change | (3) |

Major Concentration Courses

Introductory Courses

| | | |
|----------|---|---|
| HST 4101 | The Civilization of the Ancient and Medieval Worlds | 3 |
| HST 4102 | The Civilization of the Early Modern World | 3 |
| HST 4103 | The Civilization of the Modern World | 3 |
| HST 4201 | American History 1764-1848 | 3 |
| HST 4202 | American History 1848-1917 | 3 |
| HST 4203 | American History since 1917 | 3 |

Historical Skill Requirement

| | | |
|----------|---|---|
| HST 4241 | The Historian's Craft | 3 |
| HST 4263 | Oral History | 3 |
| HST 4265 | Introduction to Public History | 3 |
| HST 4821 | Field Work in History (or related APL credit) | 6 |

Regional Distribution

Choose one course from each of the following regional groupings:

| | |
|---|---|
| European: any course with a HST 44 prefix | 3 |
| American: any course with a HST 45 prefix | 3 |
| Other: any course with a HST 46 prefix | 3 |

Thematic Distribution

Choose four courses from one of the following groups A-E, or choose Group F:

| | |
|--|------|
| Group A: America's Ethnic Roots (HST 4404, 4434, 4435, 4455, 4466, 4467, 4501, 4543, 4602, 4604, 4611, 4632, 4636) | (12) |
| Group B: America's Social and Economic History (HST 4530, 4540, 4542, 4546, 4547, 4548) | (12) |
| Group C: Contemporary History (HST 4424, 4425, 4460, 4468, 4469, 4513, 4549, 4602, 4603, 4611, 4622, 4644, 4645, 4646) | (12) |
| Group D: Technological History (HST 4301, 4302, 4303, 4304, 4305) | (12) |
| Group E: Women and Family History (HST 4434, 4435, 4540, 4542, 4640, 4641) | (12) |
| Group F: Honors (HST 4811, 4812, 4813) | (12) |

Electives (preferably other than history) 54

Total Quarter Hours 174

**Bachelor of
Arts in
Liberal
Studies
Degree
(Major
Code 495)**



Core Courses

quarter hours

Communication and Critical Thinking

| | | | |
|---------------------------------------|----------|-------------------------------------|---|
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | 6 |
| ENG 4112 | | Approaches to Literature | 3 |
| INT 4200 | | The Creative Process | 3 |
| PHL 4100 | | Philosophical Thinking | 3 |
| PHL 4105 | | Philosophy of Knowing and Reality | 3 |
| PHL 4200 | | Logic | 3 |
| SPC 4101 | | Fundamentals of Human Communication | 3 |
| SPC 4102 | | Group Discussion | 3 |
| Speech Communication (any SPC course) | | | 3 |

Cultural Heritage

| | | | |
|----------|--|---|---|
| ART 4105 | | Art through the Ages | 3 |
| ECN 4137 | | History of Economic Thought | 3 |
| ENG 4131 | | God, Gods, and Heroes: Literature of the Ancient and Medieval Worlds | 3 |
| ENG 4132 | | Man, Reason, and Imagination: Literature from the Renaissance to the Romantic Age | 3 |
| ENG 4133 | | Order and Disorder: Literature of the Moderns | 3 |
| HST 4101 | | The Civilization of the Ancient and Medieval Worlds | 3 |
| HST 4102 | | The Civilization of the Early Modern World | 3 |
| HST 4103 | | The Civilization of the Modern World | 3 |
| INT 4201 | | Cultural Heritage Seminar | 3 |
| MUS 4120 | | History of Musical Styles | 3 |
| POL 4110 | | The Great Political Thinkers | 3 |

Science, Research, and Quantitative Methods

| | | | |
|------------------------------|----------|--|--------------|
| CHM 4105 | | Chemistry and the Environment | 3 |
| ECN 4250 | ECN 4251 | Statistics 1, 2 | 6 |
| ENG 4381 | | Business Writing and Reports 2 | 3 |
| MIS 4101 | MIS 4102 | Introduction to Data Processing and Information Systems 1, 2 | 6 |
| MTH 4110 | MTH 4111 | MTH 4112 | Math 1, 2, 3 |
| Science (BIO, CHM, ESC, PHY) | | | 6 |

Contemporary Studies

| | | | |
|---------------------------------|----------|--|---|
| ECN 4115 | ECN 4116 | Economic Principles and Problems 1, 2 | 6 |
| ECN 4334 | | Comparative Economic Systems | 3 |
| INT 4202 | | Contemporary Studies Seminar | 3 |
| POL 4105 | | Introduction to Comparative Politics | 3 |
| PSY 4110 | | Introduction to Psychology: Fundamental Issues | 3 |
| Psychology (any PSY course) | | | 3 |
| SOA 4155 | | Individual and Culture | 3 |
| SOC 4100 | | Roles, Culture, and the Individual | 3 |
| Sociology (any two SOC courses) | | | 6 |

continued on next page

Electives*

45

Electives may be used

- to take a University College certificate program
- to study a modern language or other area in greater depth
- to study areas of personal or career interest.

Students are encouraged to make an appointment with a University College counselor for help in selecting electives. Call 617-437-2400 for an appointment.

Total Quarter Hours

174

*Up to 44 q.h. allowed in business subjects.

**Political
Science
Bachelor of
Arts Degree
(Major Code
322)**

Core Courses**quarter hours**

| | | | |
|--|----------|------------------------------|----|
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | 6 |
| ENG 4112 | | Approaches to Literature | 3 |
| Modern Language | | Elementary or Conversational | 12 |
| | | Intermediate | 12 |
| Humanities (ART, ASL, DRA, ENG, JRN, LN, MUS, PHL, SPC, TCC) | | | 24 |
| Math-Science (BIO, CHM, ESC, MTH, PHY) | | | 18 |
| Social Sciences (in three of the following areas: ECN, HST, PSY, SOA, SOC) | | | 18 |

Major Concentration Courses

| | | |
|----------|--------------------------------------|---|
| POL 4103 | Introduction to Politics | 3 |
| POL 4104 | Introduction to American Government | 3 |
| POL 4105 | Introduction to Comparative Politics | 3 |
| POL 4331 | International Relations | 3 |
| POL 4370 | Introduction to Political Theory | 3 |

American Government*Choose three of the following:*

| | | |
|----------|-----------------------------------|-----|
| POL 4310 | American Political Thought | (3) |
| POL 4313 | State and Local Government | (3) |
| POL 4314 | Urban and Metropolitan Government | (3) |
| POL 4318 | The American Presidency | (3) |
| POL 4319 | The Legislative Process | (3) |
| POL 4320 | American Constitutional Law | (3) |
| POL 4321 | Civil Liberties | (3) |
| POL 4322 | Procedural Due Process | (3) |

Comparative Government*Choose two of the following:*

| | | |
|----------|---|-----|
| POL 4330 | Comparative Politics | (3) |
| POL 4338 | European Political Parties | (3) |
| POL 4339 | Government and Politics in the Soviet Union | (3) |
| POL 4342 | Communism in Eastern Europe | (3) |
| POL 4350 | Politics and Policies of the Developing Nations | (3) |
| POL 4352 | Government and Politics of Latin America | (3) |
| POL 4356 | Government and Politics of Northern Africa | (3) |
| POL 4357 | Government and Politics of South Africa | (3) |
| POL 4359 | Government and Politics in the Middle East | (3) |
| POL 4362 | Government and Politics of Southeast Asia | (3) |
| POL 4365 | Government and Politics of China | (3) |
| POL 4367 | Government and Politics of Japan | (3) |

continued on next page

International Relations

Choose one of the following:

| | | |
|----------|-------------------------------------|-----|
| POL 4332 | International Organization | (3) |
| POL 4333 | International Law | (3) |
| POL 4335 | Formulating American Foreign Policy | (3) |
| POL 4336 | American Foreign Policy | (3) |
| POL 4341 | Soviet Foreign Policy | (3) |
| POL 4364 | China's Foreign Policy | (3) |

Theory and Methodology

Choose one of the following:

| | | |
|----------|-------------------------|-----|
| POL 4371 | Modern Political Theory | (3) |
| POL 4311 | Research Methods | (3) |

Electives

| | |
|-------------------|----|
| Political science | 18 |
| Open electives | 27 |

Total Quarter Hours **174**

**Political
Science
Bachelor of
Science
Degree
(Major Code
322)**



Core Courses

| | | | quarter hours |
|--|----------|--|---------------|
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | 6 |
| ENG 4112 | | Approaches to Literature | 3 |
| ECN 4250 | ECN 4251 | Statistics 1, 2 | 6 |
| MIS 4101 | MIS 4102 | Introduction to Data Processing and Information Systems 1, 2 | 6 |
| Humanities (ART, ASL, DRA, ENG, JRN, LN, MUS, PHL, SPC, TCC) | | | 12 |
| Social Sciences (in three of the following areas: ECN, HST, PSY, SOA, SOC) | | | 18 |

Choose one of the following:

| | | |
|----------|--------------------------------------|-----|
| MIS 4221 | COBOL Programming 1 | (3) |
| MIS 4240 | Introduction to Programming in BASIC | (3) |
| MIS 4250 | FORTRAN Programming 1 | (3) |
| MIS 4270 | Pascal Programming 1 | (3) |

Major Concentration Courses

| | | |
|----------|--------------------------------------|---|
| POL 4103 | Introduction to Politics | 3 |
| POL 4104 | Introduction to American Government | 3 |
| POL 4105 | Introduction to Comparative Politics | 3 |
| POL 4331 | International Relations | 3 |
| POL 4370 | Introduction to Political Theory | 3 |

American Government

Choose three of the following:

| | | |
|----------|-----------------------------------|-----|
| POL 4310 | American Political Thought | (3) |
| POL 4313 | State and Local Government | (3) |
| POL 4314 | Urban and Metropolitan Government | (3) |
| POL 4318 | The American Presidency | (3) |
| POL 4319 | The Legislative Process | (3) |
| POL 4320 | American Constitutional Law | (3) |
| POL 4321 | Civil Liberties | (3) |
| POL 4322 | Procedural Due Process | (3) |

Comparative Government

Choose two of the following:

| | | |
|----------|---|-----|
| POL 4330 | Comparative Politics | (3) |
| POL 4338 | European Political Parties | (3) |
| POL 4339 | Government and Politics in the Soviet Union | (3) |

continued on next page

| | | |
|----------|---|-----|
| POL 4342 | Communism in Eastern Europe | (3) |
| POL 4350 | Politics and Policies of the Developing Nations | (3) |
| POL 4352 | Government and Politics of Latin America | (3) |
| POL 4356 | Government and Politics of Northern Africa | (3) |
| POL 4357 | Government and Politics of South Africa | (3) |
| POL 4359 | Government and Politics in the Middle East | (3) |
| POL 4362 | Government and Politics of Southeast Asia | (3) |
| POL 4365 | Government and Politics of China | (3) |
| POL 4367 | Government and Politics of Japan | (3) |

International Relations

Choose one of the following:

| | | |
|----------|-------------------------------------|-----|
| POL 4332 | International Organization | (3) |
| POL 4333 | International Law | (3) |
| POL 4335 | Formulating American Foreign Policy | (3) |
| POL 4336 | American Foreign Policy | (3) |
| POL 4341 | Soviet Foreign Policy | (3) |
| POL 4364 | China's Foreign Policy | (3) |

Theory and Methodology

Choose one of the following:

| | | |
|----------|-------------------------|-----|
| POL 4371 | Modern Political Theory | (3) |
| POL 4311 | Research Methods | (3) |

Electives

| | |
|-------------------|----|
| Political science | 18 |
| Open electives* | 66 |

Total Quarter Hours **174**

*Up to 44 q.h. allowed in business subjects.

**Psychology
Bachelor of
Arts Degree
(Major Code
319)**

| Core Courses | | | | quarter hours |
|--|----------|--|----------------------------------|---------------|
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | | 6 |
| ENG 4112 | | Approaches to Literature | | 3 |
| Modern Language | | Elementary or Conversational | | 12 |
| | | Intermediate | | 12 |
| Humanities (ART, ASL, DRA, ENG, JRN, LN, MUS, PHL, SPC, TCC) | | | | 24 |
| Math-Science (BIO, CHM, ESC, MTH, PHY) | | | | 18 |
| Social Sciences (in three of the following areas: ECN, HST, POL, SOA, SOC) | | | | 18 |
| Major Concentration Courses | | | | |
| PSY 4110 | | Introduction to Psychology: Fundamental Issues | | 3 |
| PSY 4111 | | Introduction to Psychology: Developmental Aspects | | 3 |
| PSY 4112 | | Introduction to Psychology: Personal Dynamics | | 3 |
| PSY 4220 | PSY 4221 | PSY 4222 | Statistics in Psychology 1, 2, 3 | 9 |
| PSY 4231 | | Psychology of Learning 1 | | 3 |
| PSY 4272 | | Personality 1 | | 3 |
| PSY 4351 | | Physiological Psychology 1 | | 3 |
| PSY 4381 | | Sensation and Perception 1 | | 3 |
| PSY 4561 | PSY 4562 | PSY 4563 | Experimental Psychology 1, 2, 3 | 9 |
| PSY 4611 | | Senior Seminar in Psychology | | 3 |

continued on next page

**Psychology
Bachelor of
Science
Degree
(Major Code
319)**



| Electives | | | |
|----------------------------|--|--|------------|
| Psychology | | | 18 |
| Open electives | | | 21 |
| Total Quarter Hours | | | 174 |

| Core Courses | | | quarter hours |
|--|----------|--|----------------------------------|
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | 6 |
| ENG 4112 | | Approaches to Literature | 3 |
| Math-Science (BIO, CHM, ESC, MTH, PHY) | | | 30 |
| Major Concentration Courses | | | |
| PSY 4110 | | Introduction to Psychology: Fundamental Issues | 3 |
| PSY 4111 | | Introduction to Psychology: Developmental Aspects | 3 |
| PSY 4112 | | Introduction to Psychology: Personal Dynamics | 3 |
| PSY 4220 | PSY 4221 | PSY 4222 | Statistics in Psychology 1, 2, 3 |
| PSY 4231 | | | Psychology of Learning 1 |
| PSY 4272 | | | Personality 1 |
| PSY 4351 | | | Physiological Psychology 1 |
| PSY 4381 | | | Sensation and Perception 1 |
| PSY 4561 | PSY 4562 | PSY 4563 | Experimental Psychology 1, 2, 3 |
| PSY 4611 | | | Senior Seminar in Psychology 1 |
| Electives | | | |
| Psychology | | | 18 |
| Open electives* | | | 75 |
| Total Quarter Hours | | | 174 |

*Up to 44 q.h. allowed in business subjects.

**Sociology-
Anthropology
Bachelor of
Arts Degree
(Major Code
321)**



| Core Courses | | | quarter hours |
|---|----------|--|---------------------------------|
| ENG 4110 | ENG 4111 | Critical Writing 1, 2 | 6 |
| ENG 4112 | | Approaches to Literature | 3 |
| Modern Language | | | 12 |
| | | | Intermediate |
| | | | 12 |
| Humanities (ART, ASL, DRA, ENG, JRN, LN, MUS, PHL, SPC, TCC) | | | 24 |
| Math-Science (BIO, CHM, ESC, MTH, PHY) | | | 18 |
| Social Sciences (in three of the following areas: ECN, HST, POL, PSY) | | | 18 |
| Major Concentration Courses | | | |
| SOA 4100 | | Physical Anthropology | 3 |
| SOA 4101 | | Cultural Anthropology: Kinship Societies | 3 |
| SOA 4102 | | Cultural Anthropology: State Societies | 3 |
| SOC 4100 | | Roles, Culture, and the Individual | 3 |
| SOC 4101 | | Inequality and Institutions | 3 |
| SOC 4102 | | Institutions and Social Change | 3 |
| SOC 4300 | SOC 4301 | SOC 4302 | Social Theory 1, 2, 3 |
| SOC 4331 | SOC 4332 | SOC 4333 | Social Research Methods 1, 2, 3 |
| Electives | | | |
| Sociology-Anthropology (at least nine quarter hours in SOA) | | | 21 |
| Open electives | | | 24 |
| Total Quarter Hours | | | 174 |

**Sociology-
Anthropology
Bachelor of
Science
Degree
(Major Code
321)**

| Core Courses | | | | quarter hours |
|--|----------|----------|---|----------------------|
| ENG 4110 | ENG 4111 | | Critical Writing 1, 2 | 6 |
| ENG 4112 | | | Approaches to Literature | 3 |
| Social Sciences (ECN, HST, POL, PSY) | | | | 18 |
| Major Concentration Courses | | | | |
| SOA 4100 | | | Physical Anthropology | 3 |
| SOA 4101 | | | Cultural Anthropology: Kinship Societies | 3 |
| SOA 4102 | | | Cultural Anthropology: State Societies | 3 |
| SOC 4100 | | | Roles, Culture, and the Individual | 3 |
| SOC 4101 | | | Inequality and Institutions | 3 |
| SOC 4102 | | | Institutions and Social Change | 3 |
| SOC 4300 | SOC 4301 | SOC 4302 | Social Theory 1, 2, 3 | 9 |
| SOC 4331 | SOC 4332 | SOC 4333 | Social Research Methods 1, 2, 3 | 9 |
| Electives* | | | | |
| Sociology-Anthropology (at least nine quarter hours in SOA) | | | | 39 |
| Open electives (preferably in the humanities and math-science)** | | | | 72 |
| Total Quarter Hours | | | | 174 |

*Students may use these electives to take the Human Services Concentration.

**Up to 44 q.h. allowed in business subjects.

Human Services Elective Concentration (open only to B.S. degree candidates)

| | | | | quarter hours |
|----------------------------|----------|----------|---|----------------------|
| SOC 4125 | | | Social Problems** | 3 |
| SOC 4240 | | | Sociology of Human Service Organizations** | 3 |
| SOC 4241 | | | Human Services Professions** | 3 |
| SOC 4245 | | | Poverty and Inequality** | 3 |
| SOC 4260 | SOC 4261 | SOC 4262 | Introduction to Social Work Practice 1, 2, 3** | 9 |
| PSY 4110 | | | Introduction to Psychology: Fundamental Issues† | 3 |
| PSY 4111 | | | Introduction to Psychology: Developmental Aspects† | 3 |
| PSY 4112 | | | Introduction to Psychology: Personal Dynamics† | 3 |
| PSY 4372 | PSY 4373 | PSY 4374 | Abnormal Psychology 1, 2, 3† | 9 |
| Total Quarter Hours | | | | 39 |

**SOC courses can be used for SOC electives for B.S. degree.

†PSY courses can be used for Social Science electives for B.S. degree.

Recommended Electives for Human Services Concentration Students

| | | | | |
|----------|--|--|---------------------------------------|---|
| ECN 4130 | | | Medical Economics | 3 |
| ECN 4311 | | | Human Resource Planning | 3 |
| ECN 4315 | | | Income Inequality and Discrimination | 3 |
| POL 4300 | | | Introduction to Public Administration | 3 |
| POL 4301 | | | Case Studies in Public Administration | 3 |
| POL 4306 | | | Public Policy Analysis | 3 |
| POL 4321 | | | Civil Liberties | 3 |
| PSY 4240 | | | Development: Infancy and Childhood | 3 |
| PSY 4241 | | | Development: Adolescence | 3 |

continued on next page

| | | |
|----------|----------------------------------|---|
| PSY 4242 | Development: Adulthood and Aging | 3 |
| PSY 4272 | Personality 1 | 3 |
| SOC 4170 | Race and Ethnic Relations | 3 |
| SOC 4185 | Sociology of Deviant Behavior | 3 |
| SOC 4186 | Social Control | 3 |
| SOC 4190 | Juvenile Delinquency | 3 |
| SOC 4215 | Medical Sociology | 3 |
| SOC 4220 | Sociology of Mental Health | 3 |
| SOC 4225 | Social Gerontology | 3 |

**Technical
Communications Bachelor
of Science
Degree (Major
Code 380)**



Core Courses

quarter hours

Advanced Standing Credit (possible transfer credit) **75**

Basic Communication

| | | |
|------------------------|--|---|
| ART 4140 | Graphic Communication and Production | 3 |
| ENG 4110 ENG 4111 | Critical Writing 1, 2 | 6 |
| ENG 4112 | Approaches to Literature | 3 |
| ENG 4349 ENG 4350 | Expository and Persuasive Writing 1, 2 | 6 |
| ENG 4381 | Business Writing and Reports 2 | 3 |
| JRN 4112 | Writing for Media 1 | 3 |
| PHL 4100 | Philosophical Thinking | 3 |
| PHL 4200 | Logic | 3 |
| SPC 4152 | Interviewing | 3 |

Technology

| | | |
|------------------------|--|---|
| MIS 4101 MIS 4102 | Introduction to Data Processing and Information Systems 1, 2 | 6 |
| MTH 4107 | College Algebra | 4 |
| PHY 4101 PHY 4102 | College Physics 1, 2 | 8 |

Choose one of the following:

| | | |
|----------|--------------------------------------|-----|
| MIS 4220 | Introduction to Programming in COBOL | (3) |
| MIS 4250 | FORTRAN Programming 1 | (3) |
| MIS 4270 | Pascal Programming 1 | (3) |

Major Concentration Courses

| | | |
|------------------------|---|---|
| TCC 4101 TCC 4102 | Technical Writing 1, 2 | 6 |
| TCC 4105 | Editing for Science and Technology | 3 |
| TCC 4340 | Technical Writing Portfolio Development | 3 |

Choose four of the following:

| | | |
|------------------------|--|-----|
| TCC 4110 | Technical-Promotional Writing | (3) |
| TCC 4301 TCC 4302 | Computer Software Technical Writing 1, 2 | (6) |
| TCC 4311 TCC 4312 | Instruction Manual Writing 1, 2 | (6) |
| TCC 4320 | Proposal Writing | (3) |
| TCC 4330 | The Business and Technical Presentation | (3) |

Electives

21

The following electives are recommended:

| | | |
|------------------------|---|-----|
| ACC 4101 ACC 4102 | Accounting Principles 1, 2 | (6) |
| ART 4366 | Promotional and Technical Publications: Design and Production | (3) |
| ENG 4352 | Expository Communications | (3) |
| MGT 4101 MGT 4102 | Introduction to Business and Management 1, 2 | (6) |
| TCC 4805 | Field Work in Technical Communications | (6) |

Total Quarter Hours

174

Alternative Freshman-Year Program

Richard Wilson, *Manager,
Alternative Freshman-Year Program*

249 Ryder Hall
617-437-4626

Jennifer J. Wells, *Assistant to
the Manager, Alternative Freshman-
Year Program*

Program Goals

Students in the Alternative Freshman-Year Program are considered full-time day students and are degree candidates with an undeclared major. The program is designed to help students strengthen their basic skills in writing and mathematics, while helping them gain confidence in their ability to do college-level work. The program also offers students an opportunity to consider several areas of

study before committing themselves to a specific major. Through the combination of a carefully prescribed curriculum and the attention of professional counselors, each student is helped to establish a program suited to his or her individual needs. These same counselors are normally available throughout the student's entire freshman year.

Program Structure

Students in the Alternative Freshman-Year Program normally take sixteen quarter hours of credit during each of their three freshman quarters, but may take 12 quarter hours during the first quarter and still be considered full-time students. Students in the health science track take seventeen quarter hours in their third quarter and twelve quarter hours in their fourth quarter.

After completing the prescribed Alternative Freshman-Year Program and achieving both a cumulative quality-point average of 1.400 or better and specific program requirements as noted, students may generally continue their degree programs by transferring with sophomore status, to any program in the College of Business Administration or the College of Criminal Justice as well as certain programs in the Boston-Bouvé College of Human Development Professions

and the College of Arts and Sciences. Students may also continue their degree programs within University College, as well as the College of Pharmacy and Allied Health Professions. In addition to the cumulative quality-point average of 1.400 or better, the College of Business Administration requires a 1.800 average in 5 key courses, namely, MTH 1113, ENG 4013, ENG 4014, ECN 4601, and MGT 4110. A higher cumulative grade average is also required for entrance into several majors in the College of Arts and Sciences, such as Art and Architecture (2.5), Journalism (2.25), and Speech Communication (2.5). Additional program requirements for students entering the College of Pharmacy and Allied Health Professions are listed in the *Student Handbook for Basic Colleges*.

Faculty and Resources

For the Alternative Freshman-Year Program, the University has carefully selected faculty members who are aware of the individual needs and goals of students working to adjust to a college program. Faculty and students meet in small classes of not more than twenty-five students.

As members of the program, students are considered regular Northeastern

University day students even though they have unique schedules and a distinctively tailored curriculum. Therefore, they generally have access to all counseling services, physical education facilities, dormitory arrangements, and extracurricular programs at the University's main campus in Boston.

Alternative Freshman-Year students

Faculty and Resources (con't)

are encouraged to make extensive use of the up-to-date, programmed learning resources available for self-instruction through Northeastern's Learning Resources Center. For additional assistance, these students are also frequently referred to the Academic

Assistance Center or the Math/Writing Center. A third and very important resource, the Counseling and Testing Center, is also available to students for personal and academic counseling as well as for vocational testing and counseling.

Tuition and Fees

Tuition and fees for the Alternative Freshman-Year Program are the same as for students in the Basic Day Colleges. Payment of the standard tuition during the first three academic quarters of residence entitles students

to forty-eight credit hours of instruction. Thus, those who take the forty-four programmed credits are entitled to a four-quarter-hour tuition adjustment at the regular freshman rate.

Application Procedures

For more information on the Alternative Freshman-Year Program, or to request an application, write or call the Dean of Admissions,

Department of Admissions, Northeastern University, 360 Huntington Avenue, Boston, MA 02115, 617-437-2200.

Sample One-Year Program Business Track

| Quarter 1 | | quarter hours |
|----------------------------|--|---------------|
| ED 4003 | Integrated Language Skills A | 4 |
| ENG 4013 | Fundamentals of English 1 | 4 |
| MTH 1000 | Mathematical Preliminaries 1* | 4 |
| HST 4110 | History of Civilization A† | (4) |
| or | or | |
| ECN 4601 | Economics 1** | (4) |
| or | or | |
| MGT 4110 | Survey of Business and Management** | (4) |
| Total Quarter Hours | | 12-16 |
| Quarter 2 | | |
| ED 4004 | Integrated Language Skills B | 4 |
| ENG 4014 | Fundamentals of English 2 | 4 |
| MTH 1010 | Mathematical Preliminaries 2* | 4 |
| HST 4110 | History of Civilization A | (4) |
| or | or | |
| MGT 4110 | Survey of Business and Management** | (4) |
| or | or | |
| ECN 4601 | Economics 1** | (4) |
| Total Quarter Hours | | 16 |
| Quarter 3 | | |
| ECN 4601 | Economics 1 (or Directed Elective)** | 4 |
| HST 4111 | History of Civilization B | 4 |
| MGT 4110 | Survey of Business and Management (or Directed Elective) | 4 |
| MTH 1113 | Mathematics for Business* | 4 |
| Total Quarter Hours | | 16 |

*Students will be placed in one of three math courses depending on placement test results. Those receiving advanced placement have the option of completing MTH 1114 during freshman year.

†Eligible students may take HST 4110 in the first quarter; all others take HST 4110 in the second quarter.

**Business Track students may be assigned to ECN 4601 or MGT 4110 in any quarter, but all are required to complete both courses by the third quarter.

Sample One-Year Program: Criminal Justice, Education, Arts and Sciences Track

| Quarter 1 | | quarter hours |
|----------------------------|-------------------------------|----------------------|
| ED 4003 | Integrated Language Skills A | 4 |
| ENG 4013 | Fundamentals of English 1 | 4 |
| MTH 1000 | Mathematical Preliminaries 1* | 4 |
| SOC 4010 | Principles of Sociology 1 | (4) |
| Total Quarter Hours | | 12-16 |

| Quarter 2 | | |
|----------------------------|------------------------------|-----------|
| ED 4004 | Integrated Language Skills B | 4 |
| ENG 4014 | Fundamentals of English 2 | 4 |
| HST 4110 | History of Civilization A† | 4 |
| SOC 4011 | Principles of Sociology 2 | (4) |
| or | or | |
| MTH 1010 | Mathematical Preliminaries 2 | (4) |
| Total Quarter Hours | | 16 |

| Quarter 3 | | |
|----------------------------|---|-----------|
| HST 4111 | History of Civilization B | 4 |
| POL 4106 | Introduction to Politics | 4 |
| SOC 4011 | Principles of Sociology 2 (or Directed Elective) | 4 |
| Directed Elective†† | | 4 |
| Total Quarter Hours | | 16 |

*Students will be placed in one of two math levels, depending on placement test results.

†Eligible students may take HST 4110 in the first quarter, followed by an elective in the second quarter. Most students will take HST 4110 in the second quarter.

††The Directed Elective is to be chosen with consideration for the student's intended major.

Sample One-Year Program: Health Sciences Track

| Quarter 1 | | quarter hours |
|----------------------------|---|----------------------|
| MTH 1010 | Mathematical Preliminaries 2 | 4 |
| ENG 4013 | Fundamentals of English 1 | 4 |
| CHM 1110 | Pre-Chemistry | 5 |
| ED 4001 | Integrated Language Skills Development 1 | 2 |
| Total Quarter Hours | | 15 |

| Quarter 2 | | |
|----------------------------|---|-----------|
| MTH 1106 | Fundamentals of Mathematics | 4 |
| CHM 1111 | General Chemistry 1 | 5 |
| ED 4002 | Integrated Language Skills Development 2 | 2 |
| ENG 4014 | Fundamentals of English 2 | 4 |
| Total Quarter Hours | | 15 |

| Quarter 3 | | |
|----------------------------|------------------------|-----------|
| BIO 1140 | Basic Animal Biology 1 | 4 |
| CHM 1122 | General Chemistry 2 | 5 |
| ENG 1111 | Freshman English 2 | 4 |
| Directed Elective | | 4 |
| Total Quarter Hours | | 17 |

| Quarter 4 | | |
|----------------------------|------------------------|-----------|
| BIO 1141 | Basic Animal Biology 2 | 4 |
| MTH 1107 | Functions and Calculus | 4 |
| Directed Elective | | 4 |
| Total Quarter Hours | | 12 |

Course Descriptions

Not all the courses listed in this *Bulletin* are offered every year. A final list of courses to be offered is contained in the University College *Schedule Guide*,

which gives the hours and days that classes meet and their locations. These schedules are issued prior to the fall, winter, spring, and summer quarters.

Abbreviations

q.h.: quarter hours (credit earned)
cl.: hours required in class per week
Prereq.: Prerequisite

Key To Department Codes

| | | | |
|------------|---------------------------------|------------|------------------------------------|
| ACC | Accounting | LNL | Language—Latin |
| AFR | African-American Studies | LNN | Language—Swedish |
| ART | Art, Architecture, Graphics | LNR | Language—Russian |
| ASL | American Sign Language | LNS | Language—Spanish |
| BIO | Biology | MGT | Management |
| BL | Business Law | MIS | Management Information Systems |
| CHM | Chemistry | MKT | Marketing |
| CJ | Criminal Justice and Security | MLS | Medical Laboratory Science |
| COM | Computer Literacy | MS | Management Science |
| DRA | Drama | MTH | Mathematics |
| ECN | Economics | MUS | Music |
| ED | Educational Skills | NUR | Nursing |
| EMS | Emergency Medical Services | PEP | Cardiovascular Health and Exercise |
| ENG | English | PHL | Philosophy and Religion |
| ESC | Earth Sciences | PHY | Physics |
| FI | Finance | POL | Political Science |
| HMG | Health Management | PSY | Psychology |
| HRA | Health Record Administration | PUR | Purchasing |
| HRM | Human Resources Management | RAD | Radiologic Technology |
| HSC | Health Science | RE | Real Estate |
| HST | History | REC | Recreation |
| HTL | Hotel and Restaurant Management | SOA | Sociology-Anthropology |
| IM | Operations Technology | SOC | Sociology |
| INT | Interdisciplinary | SPC | Speech Communication |
| JRN | Journalism | TCC | Technical Communications |
| LNA | Language—Arabic | TRN | Transportation |
| LNF | Language—French | | |
| LNG | Language—German | | |
| LNH | Language—Hebrew | | |
| LNI | Language—Italian | | |
| LNJ | Language—Japanese | | |

ACC 4101 Accounting Principles 1 (3 q.h.)

Study of accounting issues and objectives for proper preparation and interpretation of financial statements.

Covers the nature, function, and environment of accounting, the basic accounting model, and the accounting cycle, while emphasizing accounting for service and merchandising businesses. Also covers cash and accounts receivable.

ACC 4102 Accounting Principles 2 (3 q.h.)

Continuation of ACC 4101. Emphasizes issues in financial reporting, valuation, and income measurement. Includes inventories, plant and equipment, bonds, stockholders' equity, and changes in financial position. *Prereq.* ACC 4101.

ACC 4103 Accounting Principles 3 (3 q.h.)

Preparation and interpretation of cost accounting information and its use in the managerial decision-making process. Includes ratio analysis, present value, analysis of cost-volume relationships, fixed and variable costs, break-even analysis, job order, and process cost systems. *Prereq.* ACC 4102.

ACC 4105 Accounting Principles 1 and 2 (Intensive) (6 q.h.)

Same as ACC 4101 and ACC 4102.

ACC 4106 Accounting Principles 2 and 3 (Intensive) (6 q.h.)

Same as ACC 4102 and ACC 4103.

ACC 4120 Essentials of Personal Income Taxation (3 q.h.)

Special course for nonaccounting majors, designed to teach important aspects of personal income taxation on both federal and state levels. Tax laws, tax planning, and the preparation of individual returns are emphasized.

ACC 4201 Micro-Accounting for Professionals (3 q.h.)

Introduces the non-accounting major to some of the basic accounting principles and basic spreadsheet commands. The combination of these two skills allows the student to solve accounting problems.

ACC 4301 Intermediate Accounting 1 (Open) (3 q.h.)

Introduction to financial accounting concepts, techniques, and procedures. Areas of intensive treatment are the development and framework of

accounting theory, basic financial statements, and cash and receivables. *Prereq.* ACC 4103.

ACC 4302 Intermediate Accounting 2 (Open) (3 q.h.)

Continuation of the study of accounting concepts and procedures. Detailed examination of inventories, tangible and intangible assets, and depreciation. *Prereq.* ACC 4201.

ACC 4307 Intermediate Accounting 3 (Open) (3 q.h.)

Continuation of the study of accounting concepts and procedures, with emphasis given to conceptual aspects of measurement of liabilities and to alternative accounting treatments and procedures. *Prereq.* ACC 4302 or ACC 4402.

ACC 4310 Cost Accounting 1 (Open) (3 q.h.)

Examines cost determination, cost behavior, costing systems, and an introduction to budgeting. *Prereq.* ACC 4103.

ACC 4320 Advanced Accounting 1 (3 q.h.)

Problems associated with business combinations. A study of the purchase and pooling methods of consolidations. *Prereq.* ACC 4404.

ACC 4321 Advanced Accounting 2 (3 q.h.)

Accounting problems associated with partnerships and multinational corporations. Examines accounting for non-profit organizations. *Prereq.* ACC 4320.

ACC 4400 Accounting Information Systems (Reserved) (3 q.h.)

Provides a broad survey of accounting information systems concepts and applications. Examines how computer technology impacts accounting information processing and how accounting systems can be effectively controlled. *Prereq.* MIS 4102, ACC 4310, ACC 4303 and 80 q.h. or ACC 4403.

ACC 4404 Intermediate Accounting 4 (Reserved) (3 q.h.)

In-depth analysis of such topics as deferred income taxes, pensions, leases, and price-level accounting. *Prereq.* ACC 4403 or ACC 4303 and 80 q.h. Not open to students who have completed ACC 4407 Intermediate Accounting 3.

ACC 4410 Cost Accounting 2 (Reserved) (3 q.h.)

Examines cost determinations, cost behavior, costing systems, and an

introduction to budgeting. *Prereq.* ACC 4103 and 80 q.h.

ACC 4411 Cost Accounting 2 (Reserved) (3 q.h.)
Continuation of ACC 4410 with special emphasis on cost allocation. Covers use of cost data in decision making and the control process. *Prereq.* ACC 4410.

ACC 4401 Intermediate Accounting 1 (Reserved) (3 q.h.)
Introduction to financial accounting concepts, techniques, and procedures. Areas of intensive treatment are the development and framework of accounting theory, basic financial statements, and cash and receivables. *Prereq.* ACC 4103 and 80 q.h.

ACC 4402 Intermediate Accounting 2 (Reserved) (3 q.h.)
Continuation of the study of accounting concepts and all procedures. Detailed examination of inventories, tangible and intangible assets, and depreciation. *Prereq.* ACC 4401 and 80 q.h. or ACC 4301.

ACC 4407 Intermediate Accounting 3 (Reserved) (3 q.h.)
Continuation of the study of accounting concepts and procedures, with emphasis given to conceptual aspects of measurement of liabilities and to alternate accounting treatments procedures. *Prereq.* ACC 4302 or ACC 4402 and 80 q.h.

ACC 4408 Intermediate Accounting 4 (Reserved) (3 q.h.)
This course completes the intensive study of measurement and reporting issues in modern accounting practice. Emphasis is given to such topics as stockholder's equity and earnings per share. *Prereq.* ACC 4407 or ACC 4307 and 80 q.h.

ACC 4425 Auditing 1 (Reserved) (3 q.h.)
An examination of auditing concepts and standards relevant to the attest function. Includes coverage of such topics as: ethical and legal responsibilities of the auditor, internal control, and auditor reports. *Prereq.* ACC 4303 and 80 q.h. or ACC 4403 and ACC 4400.

ACC 4426 Auditing 2 (Reserved) (3 q.h.)
Continued examination of auditing concepts and standards relevant to the attest function. Includes compliance

and substantive tests as they relate to specific transaction cycles and the use of statistical sampling techniques. *Prereq.* ACC 4425.

ACC 4440 Federal Income Taxes 1 (Reserved) (3 q.h.)
An in-depth study of federal tax law as it applies to individuals. In addition to a coverage of the law, tax planning concepts will be emphasized. *Prereq.* ACC 4403 or ACC 4303 and 80 q.h.

ACC 4441 Federal Income Taxes 2 (Reserved) (3 q.h.)
Continuation of ACC 4440. Property transactions, including non-taxable transactions; fundamental tax law relating to corporate formation and operation, partnerships, and S corporations. *Prereq.* ACC 4440.

ACC 4442 Federal Income Taxes 3 (Reserved) (3 q.h.)
Continuation of ACC 4441. Covers application of federal tax laws to estates, gifts, and trusts; and corporate and partnership taxation. *Prereq.* ACC 4441.

ACC 4600 Honors Program 1 (4 q.h.)
Opportunity to undertake an in-depth research study project. See page 21 for details. *Prereq.* 96 q.h., 3.5 q.p.a.

ACC 4601 Honors Program 2 (4 q.h.)
See ACC 4600.

ACC 4602 Honors Program 3 (4 q.h.)
See ACC 4600.

ACC 4701 Independent Study 1 (3 q.h.)
Opportunity to undertake special research. See page 21 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

ACC 4702 Independent Study 2 (3 q.h.)
See ACC 4701.

ACC 4703 Independent Study 3 (3 q.h.)
See ACC 4701.

ACC 4800 Advanced Tutorial 1 (3 q.h.)
Opportunity to take upper-level course independently. See page 21 for details. *Prereq.* 87 q.h.

ACC 4801 Advanced Tutorial 2 (3 q.h.)
See ACC 4800.

ACC 4900 Field Work (6 q.h.)
Opportunity to enhance career development by applying academic background to practical problems in the workplace. See page 21 for details. *Prereq.* Approval of Program Director.

AFRICAN-AMERICAN STUDIES

AFR 4131 African-American History 1 (3 q.h.)

This survey covers the development of black America from the period of slavery through Reconstruction, with emphasis on the historical links between Africa and America and their impact on black development in the United States.

AFR 4132 African-American History 2 (3 q.h.)

This course examines the development of black America from Reconstruction to the present, and the effects of events in the United States and world history on the development of black America. There is special emphasis on contemporary issues and how these issues can be seen through an historical perspective.

AFR 4151 Survey of African-American Art (3 q.h.)

Black art, like black literature, has always been an important aesthetic

social statement by the African-American artist. This course offers an historical and critical examination of African-American art from the nineteenth century to the present, with special emphasis on the effects of European and African art styles on the black artist in America.

AFR 4193 Africa Today (3 q.h.)

With increasing numbers of nations striving for economic and political control in Africa, and with imperialist and colonial ideas remaining in the living memory of Africans, Africa presents a complex political and social picture to the rest of the world. This course examines some of the salient features of black art, politics, and identity in Africa.

ART AND GRAPHICS

ART 4100 History of Art (3 q.h.)

Survey of history of Western art from prehistoric times to the end of the Roman Empire. Includes the study of major monuments, artists, and stylistic developments that evolved during the Prehistoric, Primitive, Egyptian, Mesopotamian, Aegean, Greek, and Roman periods. Slide lectures and discussions.

ART 4101 History of Art to the Sixteenth Century (3 q.h.)

Survey of history of Western art from the end of the Roman Empire to the late sixteenth century. Includes the study of major monuments, artists, and stylistic developments that evolved during the Early Christian, Byzantine, Early Medieval, Romanesque, Gothic, Early and High Renaissance, and late sixteenth-century Mannerist periods. Slide lectures and discussions.

ART 4102 History of Art to the Twentieth Century (3 q.h.)

Survey of history of Western art from the late sixteenth century to the twentieth century. Includes the study of major monuments, artists, and stylistic developments that evolved during the Baroque and Rococo periods, and in nineteenth- and twentieth-century Europe and America. Slide lectures and discussions.

ART 4105 Art through the Ages (3 q.h.)

Concentrated historical survey of Western art from prehistoric cave paintings to the twentieth century. Includes the study of major monuments, artists, and stylistic developments found in the Pre-Classical, Classical, Medieval, Renaissance, and Baroque periods, and in nineteenth- and twentieth-century Europe and America. Slide lectures and discussions.

ART 4106 Introduction to Art (3 q.h.)

Introduction to the language, techniques, aesthetics, and visual styles of painting, sculpture, graphic art, and architecture. Includes individual and comparative studies of major works of art in each field, discussion of terminology, and historical examination of the social, political, and cultural significance of each art form. Slide lectures and discussions.

ART 4108 History of Landscape Painting (3 q.h.)

A survey of landscape painting from its origins in cave painting (pre-history) to its contemporary forms, charting the major movements in Western art, as well as significant developments in Eastern art.

ART 4109 Art of the Western World (Telecourse) (3 q.h.)

Examines Western visual tradition through appreciation of works of art from ancient Greece through the present day. Explores formal qualities, iconography, and technical achievement of works of art and how they reflect the attitudes of the society in which they were created. The course consists of nine one-hour television programs plus four discussion sessions.

ART 4110 Modern Art (3 q.h.)

Examination of major movements and developments in painting, sculpture, and architecture from the late nineteenth century to the present. Emphasizes changing aesthetic views and the artistic, philosophical, historical, sociological, and political influences shaping those views and the modern movement as a whole. Slide lectures and discussion.

ART 4112 Visual Foundations (Studio)* (3 q.h.)

An introduction to the fundamental principles, nature, and meaning of visual organization, leading to an understanding of the concepts of two- and three-dimensional art. Topics include problems of space, balance, and formal inter-relationships as they occur in a variety of fine arts and design.

ART 4115 Graphic Design for Non-majors (Studio)* (3 q.h.)

An introduction to graphic design processes, principles, and concepts. Students have the opportunity to learn how to estimate jobs, design layouts, and prepare mechanicals and page layouts. Other topics include typography and type specification, copyfitting, design terminology, and an introduction to printing processes.

ART 4121 Principles of Drawing and Composition (Studio)* (3 q.h.)

Introduction to the fundamental principles of drawing and composition through formal graphic studies of line, shape, value, form, light, space, pattern, and texture. Stresses the use of pencil, charcoal, conte crayon, and other dry media. Slide lectures and critiques as needed. (Laboratory fee.)

ART 4122 Introduction to Figure Drawing (Studio)* (3 q.h.)

Introduction to drawing the human form. Includes basic studies in anatomy, proportion, negative/positive space, contour, gesture, mass, line, composition, and drawing technique. Slide lectures, critiques, and weekly sessions drawing from the model. (Laboratory fee.)

ART 4123 Drawing Workshop (Studio)* (3 q.h.)

Introduction to more advanced problems in the analysis of visual language and its creative organization. Emphasizes strengthening drawing techniques and developing a personal style.

ART 4125 Art Projects Workshop (Studio)* (3 q.h.)

This course is designed for students who have completed one or more basic courses in the visual arts. This workshop furthers the competency in the creation of two-dimensional visual art. The student's creative resources will be stressed as the source for traditional and non-traditional approaches to portrait, figure, and other subject matter. Investigations will center on drawing, painting, and printmaking as

**Courses designated "(Studio)" meet for 3½ hours.*

interactive means of art expression. Watercolor, oil, acrylics, pastels, and other media will be used as drawing and painting methods. Monotype printing will be examined as a printing method that evolves from painting and drawing.

ART 4126 Landscape Painting (Studio)*
(3 q.h.)

An introduction to the art of landscape painting. This course will draw upon the traditions of landscape representation in the history of art, and the creative and expressive potential of each student. Sketching and painting outdoors are treated as an integral part of the course.

ART 4127 Basic Painting (Studio)* (3 q.h.)
Introduction to the fundamentals of painting. Includes formal studio assignments in the study of color, light, pictorial space systems, form, texture, and composition to establish a foundation for more individual, creative expression. Critiques and slide lectures as needed.

ART 4128 Intermediate Painting (Studio)*
(3 q.h.)

Fundamental principles of painting, followed by more advanced studies in shape, scale, texture, brushstroke, and edge as well as color, light, form, and composition. Examines problems in a variety of stylistic approaches and techniques from the past and the present. Critiques and slide lectures as needed.

ART 4129 Painting Workshop (Studio)*
(3 q.h.)

Individual development through a structured, project-oriented approach. Encourages recognition of the conceptual aspects of painting as well as the development of a personal painting style and unique visual imagery. Critiques and slide lectures as needed.

ART 4130 Printmaking: Relief (Studio)*
(3 q.h.)

Fundamental course in the production of prints using the relief process. Includes woodcut, linoleum, block-cut,

and other relief print techniques. Also explores paper stocks, inks, and carving and printing.

ART 4132 Printmaking: Intaglio (Studio)*
(3 q.h.)

Fundamental course in the production of prints using the intaglio process. Includes etching, aquatint, dry point, engraving, sugar-lift, and other intaglio techniques. Focuses on drawing and design skills and on understanding the printmaking craft.

ART 4134 Color and Design Practice (Studio)* (3 q.h.)

Intermediate-level problems in the aesthetic organization of color and design elements. Includes expressive possibilities of color orchestration, color harmonies, light as color, and the spatial characteristics of color.

ART 4135 Design Foundations and Techniques (Studio)* (3 q.h.)

Introduction to the basic principles of two-dimensional design. Emphasis on tools and techniques used in the design field. Projects in two-dimensional visual perception and organization of forms in composition. Students develop their "design sense" while becoming proficient with fundamental board skills.

ART 4136 Basic Watercolor Painting (Studio)*
(3 q.h.)

Practice and creative expression in the technical fundamentals of watercolor.

ART 4137 Watercolor Painting Practice (Studio)* (3 q.h.)

Creative expression in various watercolor techniques. *Prereq.* ART 4136 or instructor's permission.

ART 4138 Techniques of Watercolor Painting (Studio)* (3 q.h.)

Advanced expression in watercolor. *Prereq.* ART 4137 or instructor's permission.

ART 4139 Color Theory and Practice (3 q.h.)
Exploration of the objective nature and expressive possibilities of color. Through classwork and projects students examine the major theories and laws of color, its harmonies and special characteristics as well as color psychology, symbolism, and orchestra-

**Courses designated "(Studio)" meet for 3½ hours.*

tion. Students discover their intuition for color and develop its application in art and design.

ART 4140 Graphic Communication and Production (3 q.h.)

Overview of the design and production processes of printed materials. Examines the designer's role in concept development and layout and introduces reprographics, typesetting, printing and color techniques, paper, and bindery methods. The scheduling and economic factors involved in bringing a piece to print are also addressed.

ART 4141 Graphic Design 1 (Studio)* (3 q.h.)

Introduction to professional problem-solving in graphic design, including typographic and pictorial elements and their integration with verbal content to communicate ideas. Emphasis is on the fundamentals of visual thinking, concept development, and two-dimensional layout. Students gain experience with the design process from thumbnail sketches to the finished mechanical. *Prereq.* ART 4135 or instructor's permission.

ART 4142 Graphic Design 2 (Studio)* (3 q.h.)

Intermediate study and creative work in professional problem-solving in graphic design, with emphasis on creating overall design concepts. Students explore effective problem-solving techniques by taking a variety of projects from concept to finished presentation. *Prereq.* ART 4141.

ART 4143 Advertising Design (Studio)* (3 q.h.)

Introduction to advertising and to the language and design problems commonly met in the field. Study and creative work in advertising research analysis, layout, and preparation of client presentations. Marketing fundamentals are also addressed. *Prereq.* instructor's permission. *Prereq. for Advertising Certificate students:* ART 4142.

ART 4151 Typography (3 q.h.)

The evolution of typography and its current applications. Emphasizes understanding basic typographic terms and techniques, acquiring composition skills such as copyfitting and

type specification, understanding typography as symbol and as written record, exploring design concepts through typography, and learning the creative potential of new typesetting systems. Field trips to view state-of-the-art phototypesetting systems.

ART 4160 Basic Photography (Studio)*

(3 q.h.)

Use of the camera, the negative, and the black-and-white print for the beginning student. Includes weekly shooting assignments, demonstrations, and hands-on darkroom experience. (Laboratory fee.)

ART 4161 Intermediate Black and White Photography (Studio)* (3 q.h.)

Continuation of ART 4160. Focuses on further practice in darkroom skills and production of clear and expressive images. (Laboratory fee.) *Prereq.* ART 4160.

ART 4162 Photography Workshop (Studio)*

(3 q.h.)

Through close interaction with the instructor, students refine their technical skills and learn to make meaningful decisions about their relation to the world through the use of photography. Alternative processes such as infrared, toners, and large format are demonstrated and used. Contemporary trends in photography are illustrated through frequent slide presentations. (Laboratory fee.) *Prereq.* ART 4160 or equiv.

ART 4163 Introduction to Color Photography (Studio)* (3 q.h.)

Basic color theory and contemporary photographic processes and practices. Students work with color negative materials and print from color slides and negatives. Color printing facilities are provided. Lectures and critiques when appropriate. (Laboratory fee.) *Prereq.* ART 4160 or equiv.

ART 4164 Color Projects in Photography (Studio)* (3 q.h.)

Continuation of ART 4163. *Prereq.* ART 4163. (Laboratory fee.)

ART 4165 Seeing in Color (3 q.h.)

Investigates basic principles of color photography through lectures,

**Courses designated "(Studio)" meet for 3½ hours.*

demonstrations, and critique. Color slide film will be used, eliminating the need for lab work. Emphasis is on using color for creative personal expression. (No prereq.)

ART 4171 American Cinema (3 q.h.)

This course explores the uniquely distinguishing characteristics of American cinema. These range from such formal elements as camera angles, lighting, editing, sound, acting, narrative structure and construction of point of view. The course will also analyze such recurring concerns of American cinema as the individual and community, issues of masculinity and violence, urban alienation, uprootedness and adolescence. The directors whose work will be discussed include Michael Cimino, Martin Scorsese, Robert Altman, Francis Ford Coppola, and John Ford.

ART 4173 International Cinema (3 q.h.)

This course examines films of such diverse countries as France, Italy, Greece, India, Japan, and Argentina and shows how film style and film language are culturally based and reflect the underlying values of culture. The course also analyzes the differences in the construction of narrative and point of view in the films of the different countries. The impact of cultures with communal or extended family social structures on camera angles and sound is also examined. The directors whose work will be studied include Karel Reisz, Claude Chabrol, Luchino Visconti, Kenji Mizoguchi, and Satyajit Ray.

ART 4174 Themes in Film (3 q.h.)

This course takes one theme as its subject and explores that theme fully through films from different countries. The themes include family relationships, gender, coming of age, and war, as well as the journey/road film, the concert/music film, and the exploration of the "other" in film. The course focuses on different portrayals of a given theme through analysis of film language such as camera angles, sound, editing, narrative structure, and construction of point of view, and how these relate the story of the film.

ART 4175 History of Graphic Design (3 q.h.)

Graphic design from the mid-nineteenth century (the Industrial Revolution) to the present, with references to earlier influences. Focuses on the evolution of the graphic design field, its nature and function, major periods and trends, and the influence of technology and society. Slide lectures and discussion.

ART 4176 International Directions in Graphic Design (3 q.h.)

Contemporary theories and practices in international graphic design. Focuses on design activities in such major industrial nations as Germany, Italy, France, England, Canada, Japan, and the United States. Case studies reflecting graphic design solutions to a variety of visual communication problems are examined. Slide lectures and discussion.

ART 4181 Introduction to Computer-Aided Graphic Design (Studio)* (3 q.h.)

Introduction to the terminology, concepts, and applications of computer-aided graphic design. Through lectures, demonstrations, and labs, students explore the range of computer graphics technology from personal computers to large-scale, dedicated, turn key systems; input and output devices and their applications; the advantages and limitations of computers as design tools; and the future impact of computer graphics on graphic design and communication. Lectures are complemented by hands-on computer sessions. Guest lecturers and field trips. Limited enrollment. (Laboratory fee.) *Prereq.* ART 4140.

ART 4182 Computer-Aided Graphic Design Workshop (Studio)* (3 q.h.)

An interdisciplinary course further exploring the creative potential of computer graphics applications. Students work with various forms of input and output devices to become acquainted with the artistic potential of each interface. Limited enrollment. (Laboratory fee.) *Prereq.* ART 4181 or equiv.

**Courses designated "(Studio)" meet for 3½ hours.*

ART 4183 Electronic Publishing Design (Studio)* (3 q.h.)

Designed to teach the computer novice how to apply the basics of electronic publishing software for business and corporate publications. Students will use a variety of PC application programs including Ventura, PageMaker, and popular paint and draw programs. Design, page-layout, typography, hardware, and management issues will be applied to real life publications and business documents. (Laboratory fee.) *Prereq.* ART 4140.

ART 4184 Business Presentation Graphics (Studio)* (3 q.h.)

Students will create and produce computerized slide presentations for specific corporate problems. Emphasis is placed on the selection and layout sequencing of type, visuals and peripheral elements for word slides, graphs, charts, and support data relevant to business sales and agenda presentations. (Laboratory fee.) *Prereq.* ART 4181.

ART 4185 Creative Imaging: Custom Computer Design (Studio)* (3 q.h.)

Vector drawing programs, raster-based paint programs, scanning, and image enhancement techniques are utilized to create original visuals appropriate for advertising, publishing, and television graphics. Students will create logo designs, new graphics, book and magazine cover designs, and editorial illustrations. (Laboratory fee.) *Prereq.* ART 4182.

ART 4186 Computer Graphic Design Portfolio (Studio)* (3 q.h.)

Students may choose to either edit and refine a series of their best computer graphic designs or to work on a specific portfolio design project. All students will design a self-promotion piece using the layout application of their choice. *Prereq.* ART 4185.

ART 4187 Graphic Software Studies 1 (Studio)* (3 q.h.)

Identification and application of popular vector-based drawing programs including: MacDraw, Adobe

Illustrator, Free Lance, Free Hand, and AGX Custom. (Laboratory fee.) *Prereq.* ART 4182.

ART 4188 Graphic Software Studies 2 (Studio)* (3 q.h.)

Identification and application of pixel/raster-based paint programs including: MacPaint, Targa Tips, Pixel Paint, and Lumena. (Laboratory fee.) *Prereq.* ART 4182.

ART 4189 Graphic Software Studies 3 (Studio)* (3 q.h.)

Identification and application of pagination, layout, and design programs including: PageMaker, Ventura, ReadySetGo, Interleaf, and Quark Express. (Laboratory fee.) *Prereq.* ART 4182.

ART 4204 Italian Renaissance Art (3 q.h.)

Survey of Italian painting, sculpture, and architecture of the fifteenth and sixteenth centuries, with special attention to their historical, cultural, and social contexts. Considers how Renaissance ideals were reflected in the renewed interest in classical harmony and order, and in the growing self-awareness, individualism, and naturalism of the time. Covers such artists as Giotto, Donatello, Botticelli, Michelangelo, da Vinci, Raphael, and Titian.

ART 4210 French Painting (3 q.h.)

Development of French painting from the French Revolution through the nineteenth century. Examines Neoclassicism, Romanticism, Realism, Impressionism, and Post-Impressionism, focusing on such figures as David, Delacroix, Courbet, Manet, Degas, Monet, Renoir, Cezanne, and Van Gogh. Also examines the French interest in the formal problems of painting and the painting process as distinct from its narrative content.

ART 4213 Modern Painting (3 q.h.)

Developments in painting from the late nineteenth century through the early 1930s, examining major schools, movements, and artists from Post-Impressionism through Surrealism. Focuses on important shifts in painting concepts and the rise of innovative

*Courses designated "(Studio)" meet for 3½ hours.

modes of expression instrumental in establishing the foundation of Modernism.

ART 4214 Contemporary Painting (3 q.h.)

Developments in painting from the early 1940s to the present, including major schools, movements, and artists. Focuses on the cultural impact of the exodus of artists from Europe to the United States prior to World War II, the meteoric rise of Abstract Expressionism, and the diversity of movements since World War II, such as Pop Art, Minimalism, Conceptual Art, and New Realism.

ART 4220 American Painting and Sculpture (3 q.h.)

American painting and sculpture from colonial times through the early 1930s. Includes the study of painting from itinerant colonial "limners" through Copley, Benjamin West, and the English tradition; the Hudson River School; Eakins, Hopper, Marin, Stella, and O'Keeffe; and the founding of American Modernist painting. Also examines sculpture from colonial gravestone reliefs through Rush, Augur, and the public monuments of French, Saint-Gaudens, and Calder.

ART 4221 Women in Art and Women Artists (3 q.h.)

Women in the arts from prehistoric times to the present. Focuses on women as symbols, religious figures, and erotic objects, and on idealized images of femininity. Examples include fertility images, Venus images, Madonnas, portraits, and genre works. Also examines the historical role of women as artists.

ART 4223 American Architecture (3 q.h.)

American architecture from the Colonial period through the early 1930s. Includes the seventeenth-century Early American style, the eighteenth-century Georgian style, the Republican style, mid-nineteenth-century Revival styles, the Stick-and-Shingle styles, Richardsonianism, Sullivan and the rise of the skyscraper, and Frank Lloyd Wright.

ART 4228 Twentieth-Century Architecture (3 q.h.)

Introduction to European and American architecture of the twentieth century. Examines Gropius's Bauhaus tenets concerning housing, urban planning, and utilitarian mass production; Mies van der Rohe, Le Corbusier, and the International style; Frank Lloyd Wright; and the foundation of American architectural Modernism as exemplified by Neutra, Johnson, Saarinen, and Buckminster Fuller.

ART 4230 History of Photography (3 q.h.)

Developments in photography from the early daguerreotypes to the present. Includes major movements, styles, artists, and significant technological developments. Slide lectures and assigned readings.

ART 4231 Contemporary Photography (3 q.h.)

Evolution of styles and techniques in contemporary photography since World War II. Emphasis is on the variety of image-making techniques and photographic styles and concepts of the last twenty years. Slide lectures and assigned readings.

ART 4251 Advanced Graphic Design (Studio)* (3 q.h.)

Portfolio-development course for students who have successfully completed all other Graphic Design and Visual Communication certificate program requirements. Emphasis is on professional design skills and personal style. *Prereq.* 27 q.h. of graphic certificate courses. *Prereq.* ART 4151.

ART 4366 Promotional and Technical Publications: Design and Production (3 q.h.)

Design, production, and economics of promotional and technical publications. Using a case-study approach with a micro-based computer system, students explore design and production of marketing, advertising, and sales-support publications as well as technical service manuals, operating guides, and other documentation. *Prereq.* ART 4151. *Not open to students who have taken ART 4364 or ART 4365.*

*Courses designated "(Studio)" meet for 3½ hours.

ART 4367 Illustration (3 q.h.)

Introduction to promotional and editorial illustration, including applications in advertising and publishing. Covers the objectives, tools, and techniques unique to illustration. Lectures, demonstrations, and hands-on studio projects. *Prereq.* ART 4151. Biomedical Illustration certificate students see BIO 4420.

ART 4368 Graphic Design for Media (3 q.h.)

Surveys the expanding use of slide-tape, multi-image, and multi-media video and film in areas ranging from public relations and sales to documentary and entertainment presentations. The collaborative role of writers, producers, and art directors in the design and production of media projects, particularly audio-visual projects is explored. *Prereq.* ART 4151.

ART 4402 Marketing Strategies for Printing and Publishing (3 q.h.)

Topics include the integrated nature of marketing; the relationship of marketing to product development; advertising, promotion, and sales; the creation of marketing support materials; and the development of an overall marketing plan and timeline.

ART 4410 Electronic Imaging Systems (3 q.h.)

An introduction to current black-and-white and color image scanning, processing and separation technology for page and film assembly. Concepts, terminology, and techniques of manipulating, merging, and creating graphics electronically.

ART 4415 Electronic Document Production (3 q.h.)

Current principles and methods of electronic publishing and electronic document production. Instruction on text inputting, text markup, and editing during the review cycle, selection of style prior to input/composition, tagging, development of page layouts, graphics development, integration, and manipulation.

ART 4416 Style Set-Up for Electronic Document Production (Studio)* (3 q.h.)

Style specifications for electronic document production. Instruction on format definitions; pagination, hyphenation,

and justification specification; page layout definition; and interactive layout tool usage. *Prereq.* ART 4415.

ART 4421 Methods of Book Design (Studio)* (3 q.h.)

The basic terminology, tools, and skills of book design. Students practice drawing layouts, casting off manuscript, specifying type, and dummyping pages. *Prereq.* ART 4141.

ART 4431 Graphic Composition Systems 1 (Studio)* (3 q.h.)

Current principles and methods of photocomposition as compared to desktop publishing systems. Covers all aspects of the composition process, including markup, copyfitting, parameter set-up, input, correcting, and output. A variety of popular software including Pagemaker, Ready-Set-Go, Ventura Publisher, and Deskset Design Edition II is translated and output on laser and photocomposition systems.

ART 4432 Graphic Composition Systems 2 (Studio)* (3 q.h.)

Emphasis is on computer mainframe interfacing, ACI operation and telecommunications, networking, developing translation tables, word processing/data conversion, automatic tabulation, and pagination. *Prereq.* ART 4431.

ART 4443 Imaging Procedures and Systems 1 (Studio)* (3 q.h.)

Methods and operations involved in producing film negatives and assembled flats. Students have the opportunity to create line and halftone negatives. Also covered are contacting, darkroom, and film assembly procedures; signature imposition, halftone, and combination flat techniques; and reflection transmission densitometry.

ART 4444 Imaging Procedures and Systems 2 (Studio)* (3 q.h.)

Creating black and white color mechanical separation masks by conventional contacting methods. Includes planning and preparing separation masks for "fake" color, selecting screen tint values, making and correcting color proofs; creating special effects with

**Courses designated "(Studio)" meet for 3½ hours.*

posterization, making duotones, and process color-film assembly. *Prereq.* ART 4443.

ART 4461 Applications of Electronic Publishing (3 q.h.)

Examination of how electronic and desktop publishing system technology applies to publishing, typesetting, and printing. Topics include a review of electronic publishing fundamentals, state-of-the-art systems, and trends in graphic arts technology, with sessions devoted to book publishing; magazine publishing; pre-press and type house applications; commercial, corporate, or in-plant publishing; newspaper publishing; and government and small business applications. Also covers organization structure, business issues, product, and in-depth analysis of production/workflow procedures and cost justification criteria.

ART 4465 Business Operations for the Graphic Arts (3 q.h.)

Introduction to operations management specifically designed for the graphics industry. Basic business concerns of accounting, finance, budgeting, marketing, planning, communications, personnel, motivation, and leadership.

ART 4466 Establishing and Operating a Small Graphics Business (3 q.h.)

The positioning process used to determine the proper market for the service or product. Students explore how positioning and market research affect image, public relations materials, advertising, pricing, and actual production methods for a given graphics business. Establishing hourly rates, record keeping, job quoting, billing procedures, sales techniques, and state and federal tax requirements for small businesses.

ART 4468 Safety and Health Issues for the Graphic Arts (3 q.h.)

A thorough examination of potential hazards including fire, electrical, sound, chemicals, and toxic fumes. Study of the rules and regulations of OSHA, the role of safety committees in complying with OSHA requirements, and the effect these requirements have on various business operations within the company. Additional information is

provided on ergonomics, job stress, and employer-employee rights and responsibilities.

ART 4469 Operations Analysis for the Graphic Arts Industry (3 q.h.)

The principles and practices of work simplification as they apply to the graphic arts industry. Topics include process analysis, operations analysis, motion and micromotion study, plant and workplace layout, equipment design and selection, labor cost reduction, operator training, human relations problems, time study and time standards, and techniques for improving productivity.

ART 4471 Quality Control in the Graphic Arts Industry (3 q.h.)

Basic concepts and costs of quality, organization for quality, programs for improving quality and reducing waste and spoilage, materials processes, and product quality-control procedures as they relate to printing and publishing. Basic statistical quality-control concepts such as process capability and analysis, control charts, and sampling.

ART 4474 Research and Technology Evaluation for Electronic Publishing and Printing (3 q.h.)

Developing and conducting needs assessment tools for the identification of appropriate electronic publishing technology. Topics include a description of various electronic publishing businesses; current and future staffing and training needs; current and future control forms; current design standards; determining productivity levels; and matching vendor functions and features to the needs of the organization.

ART 4475 Graphic Arts Production Control (3 q.h.)

The techniques of managing production in commercial printing and publishing plants. Specialization vs. standardization, production forecasting and control; routing and planning; records of production; quality control; and effective use of personnel. Various production management controls of web- and sheet-fed, commercial, and publication printing are presented, analyzed, and discussed.

ART 4479 Estimating Procedures for the Graphic Arts (3 q.h.)

Basic estimation procedures and principles for single- and multi-color printing. All facets of planning the job for estimating: design and layout, typography, paper, prep and plates, presswork, binding, and finishing. Emphasis throughout is on active student participation in solving practical estimation problems.

ART 4500 Senior Project (3 q.h.)

Seniors choose a final major project to demonstrate professional proficiency and originality in a specific area of design. Finished projects are reviewed by a board of design faculty with the student present to discuss and defend the effectiveness and merit of the project.

ART 4501 Portfolio Development (3 q.h.)

Opportunity for students to select and polish their best design pieces and create a unified, professional portfolio. Concentration is on materials and options available for showing two- and three-dimensional works in one-to-one

and group situations. Attention is also given to the design resume and to interview and presentation skills.

ART 4810 Honors Program 1 (4 q.h.)

Opportunity to undertake an in-depth research study project. See page 21 for details. *Prereq.* 96 q.h., 3.5 q.p.a.

ART 4811 Honors Program 2 (4 q.h.)

See ART 4810.

ART 4812 Honors Program 3 (4 q.h.)

See ART 4810.

ART 4815 Advanced Tutorial 1 (3 q.h.)

Opportunity to take upper-level course independently. See page 21 for details. *Prerequisite* 87 q.h.

ART 4816 Advanced Tutorial 2 (3 q.h.)

See ART 4815.

ART 4820 Independent Study 1 (3 q.h.)

Opportunity to undertake special research. See page 21 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

ART 4821 Independent Study 2 (3 q.h.)

See ART 4820.

ART 4822 Independent Study 3 (3 q.h.)

See ART 4821.

**AMERICAN
SIGN
LANGUAGE**

ASL 4101 American Sign Language 1 (4 q.h.)

Introduction to American Sign Language, the language used by members of the deaf community in the United States and parts of Canada. Focuses on conversation in signs, basic rules of grammar, and cultural aspects of the deaf community.

ASL 4102 American Sign Language 2 (4 q.h.)

Continuation of basic American Sign Language and culture study, with emphasis on building receptive and expressive sign vocabulary; use of signing space; use of nonmanual components, including facial expressions and body postures; and an introduction to finger spelling. *Prereq.* ASL 4101 or by examination.

ASL 4201 Intermediate American Sign Language 1 (4 q.h.)

Further development of receptive and expressive skills, finger spelling, vocabulary building, and grammatical structures. Encourages more creative use of expression, classifiers, body

postures, and the signing space. Introduces sign variations (regional and ethnic), and political and educational institutions of the deaf community. *Prereq.* ASL 4102 or by examination.

ASL 4202 Intermediate American Sign Language 2 (4 q.h.)

Intensive practice involving expressive and receptive skills in storytelling and dialogue. Introduces language forms found in ASL poetry and cultural features as they are displayed in art and theatre. *Prereq.* ASL 4201.

ASL 4301 Advanced American Sign Language Proficiency 1 (4 q.h.)

Vocabulary building and mastery of grammar through rigorous receptive and expressive language activities. Includes student-led discussions, debates, and prepared reports on topics in deaf culture, society, and current affairs. *Prereq.* ASL 4202.

ASL 4302 Advanced American Sign Language Proficiency 2 (4 q.h.)

Continuation of ASL 4301. *Prereq.* ASL 4301.

ASL 4410 Linguistics of American Sign Language (3 q.h.)

For skilled ASL signers with no previous training in linguistics. Conducted in ASL, the course is descriptive and data-oriented rather than theoretical. Includes the parts of a sign; building words in ASL; sentence structure (questions, statements, relative clauses, etc.); the meaning and issue of iconicity; organization of sentences according to old and new information; and the structure of stories. Also, grammatical features of ASL, such as classifiers, specifiers, verb modulations and aspects, and the role of facial expression. *Prereq.* ASL 4102.

ASL 4411 Deaf History (3 q.h.)

The history of deaf people in the Western world, with emphasis on the American deaf community, its language, education, and relation to hearing society. *Prereq.* ASL 4101 or instructor's permission.

ASL 4412 American Deaf Culture (3 q.h.)

The status of deaf people as both a linguistic and cultural minority group. Designed for individuals who may or may not have had prior experience with deaf people, the course raises questions concerning the nature of sign language and its varieties, the education of deaf people, the historical treatment of deafness, the sociological and cultural makeup of deaf individuals, and the nature of ASL literature and poetry.

ASL 4413 Deaf Literature (3 q.h.)

Students read and discuss in ASL various genres of American Sign Language literature. Concentration is on the work of current recognized narrators in both literary and face-to-face storytelling traditions. Includes selected autobiographical sketches, lectures, stories, and letters from the early 1900s by such figures as Clerc, Veditz, Hotchkiss, Gallaudet, and others. A videotaped research essay is required at the end of the course. *Not*

open to students who have taken ASL 4401. Prereq. ASL 4202 or by examination.

ASL 4600 Introduction to Interpreting

(formerly ASL 4501 Sign Language Interpreting 1) (3 q.h.)

An overview of the interpreting profession, including the responsibilities, ethics, and aptitudes of interpreters; professional associations; the law and business of interpreting; the bicultural, bilingual context in which interpreting takes place; basic translation and interpretation; environment and audience; special populations; free-lance versus in-house positions; and evaluation and certification. *Prereq.* ASL 4302 or instructor's permission.

ASL 4601 American Sign Language Interpreting 1 (4 q.h.)

Translations dealing with a variety of styles and registers, study of the interpreting process, discourse analysis, and consecutive interpreting. *Prereq.* ASL 4410; ASL 4302 and ASL 4600 may be taken concurrently.

ASL 4602 American Sign Language Interpreting 2 (4 q.h.)

Breakdown of the simultaneous interpretation task into several phases. Emphasizes divided attention, paraphrasing, cloze skills, and flexibility in English and ASL. *Prereq.* ASL 4601.

ASL 4603 American Sign Language Interpreting 3 (4 q.h.)

Refinement of skills learned in ASL 4601 and ASL 4602. *Prereq.* ASL 4602.

ASL 4604 Special Topics in Interpreting 1 (3 q.h.)

Topics concerning interpretation for special deaf populations, including the oral, deaf-blind, emotionally, and multiply handicapped. Covers theory and practice. *Prereq.* ASL 4601.

ASL 4605 Special Topics in Interpreting 2 (3 q.h.)

Deals with interpretation in specific situations, including educational, legal, psychiatric, and medical. Emphasizes work with the intermediary interpreter. *Prereq.* ASL 4601.

ASL 4606 Interpreter Roles and Ethics

(3 q.h.)

Discussions, hypothetical situations, and role playing that explore ethical standards and dilemmas in sign language interpreting and in other professions. Also, culturally objective standards, ethics, and professional principles; power versus responsibility; and the RID Code of Ethics. *Prereq.* ASL 4601 and ASL 4412, which may be taken concurrently.

ASL 4607 Interpreting Lab (4 q.h.)

Practice in simultaneous interpreting skills, with constructive feedback. *Prereq.* ASL 4603.

ASL 4608 Practicum (4 q.h.)

Practical interpreting experience in agencies serving deaf people. Biweekly seminar focuses on linguistic and ethical questions and dilemmas. Requires six hours per week in an agency. *Prereq.* ASL 4603, ASL 4604, ASL 4605, ASL 4606, and ASL 4607.

ASL 4800 American Sign Language Interpreting Seminar (formerly ASL 4507-ASL 4510 American Sign Language Interpreting Seminars) (1 q.h.)

Short-term training opportunities for currently practicing sign language interpreters, scheduled for two Saturdays

each fall, winter, and spring quarter. Because the topics or skill areas addressed change from quarter to quarter, students may take this course repeatedly for credit. Limited enrollment. For topic information, call American Sign Language Programs, 617-437-3064 (voice) or 617-437-3067 (TTY).

ASL 4801 Advanced Tutorial in ASL 1 (4 q.h.)

Opportunity for qualified student to take an upper-level, required course as a tutorial when it is not available in the usual format. The tutorial format, which involves a combination of meetings with the tutorial advisor, phone conferences, and outside course preparation, will conform with University standards of 12 hours of academic work per week.

ASL 4802 Advanced Tutorial in ASL 2 (4 q.h.)

Opportunity for qualified student to take an upper level, required course as a tutorial when it is not available in the usual format. The tutorial, which involves a combination of meetings with the tutorial advisor, phone conferences, and outside course preparation, will conform with University standards of 12 hours of academic work per week.

BIOLOGY**BIO 4103 Biology 1 (General)** (4 q.h.)

Biology of the cell, including its ultrastructure, function, diversity, genetics, and reproduction. Also examines the molecular composition of cells, including enzymes, chemistry, bioenergetics, respiration, and photosynthesis. *To receive credit for this course, you must also register for BIO 4153, Lab for Biology 1 (Laboratory fee).*

BIO 4104 Biology 2 (Animal) (4 q.h.)

Systematic comparative study of the diversity of animal life forms, including structure, function, environment, and evolution. *To receive credit for this course, you must also register for BIO 4154, Lab for Biology 2 (Laboratory fee).* *Prereq.* BIO 4103 or equiv.

BIO 4105 Biology 3 (Animal) (4 q.h.)

Functional anatomy of animal organ systems, including locomotion, nutri-

tion, internal transport, gas exchange, molecular regulation, defense systems, nervous and hormonal control, and sensory reception. Also covers ecology, population dynamics, and the origin of life. *To receive credit for this course, you must also register for BIO 4155, Lab for Biology 3 (Laboratory fee).* *Prereq.* BIO 4104 or equiv.

BIO 4133 Special Topics in Botany (3 q.h.)

Topics covered: How botany impacts human life and society; current genetic manipulation of agricultural plants; historical role of plants in pharmacology; the role of plants and agriculture in the cultural evolution of man (nomad to farmer); botany in literature and poetry.

**Taught odd-numbered academic years.*

BIO 4175 Human Anatomy and Physiology 1 (3 q.h.)

Introduction to human gross anatomy, including osteology, myology, and angiology of the thorax, abdomen, pelvis, head, and neck. The laboratory generally includes a study of human bones and cat dissection. *The required laboratory is BIO 4195, Lab for Human Anatomy and Physiology 1 (Laboratory fee).*

BIO 4176 Human Anatomy and Physiology 2 (3 q.h.)

Anatomy and physiology of the nervous system, endocrine glands, senses, respiratory system, and membranes. The laboratory generally includes gross and microscopic anatomy of the nervous and endocrine systems, and physiology of the nerves, muscles, vision, hearing, and respiratory system. *The required laboratory is BIO 4196, Lab for Human Anatomy and Physiology 2 (Laboratory fee).*

BIO 4177 Human Anatomy and Physiology 3 (3 q.h.)

Anatomy and physiology of the cardiovascular, digestive, urinary, and reproductive systems; fetal development. The laboratory generally deals with the microscopic anatomy of these systems and the physiology of the blood, heart, and urinary tract. *The required laboratory is BIO 4197, Lab for Human Anatomy and Physiology 3 (Laboratory fee). Prereq. BIO 4176 or equiv.*

BIO 4178 Anatomy and Physiology A (4 q.h.)

Human anatomy and physiology. Describes the cell and its physiology, the structure of tissues, and the anatomy and physiology of the cardiovascular system and blood, the respiratory system, and the urinary system. *The required laboratory is BIO 4198, lab for Anatomy and Physiology A (Laboratory fee). BIO 4178 and BIO 4179 may not be substituted for BIO 4175, 4176, 4177.*

BIO 4179 Anatomy and Physiology B (4 q.h.)

Continuation of BIO 4178. Describes the anatomy and physiology of the nervous system, skeletomuscular system, digestive system, endocrine and reproductive systems. *The required*

laboratory is BIO 4199, lab for Anatomy and Physiology B (Laboratory fee). Prereq. BIO 4178. BIO 4178 and BIO 4179 may not be substituted for BIO 4175, 4176 and 4177.

BIO 4185 The Natural World of Massachusetts 1* (3 q.h.)

Ecological analysis of the human situation and human interaction with other organisms; the necessary foundation of biological principles.

BIO 4186 The Natural World of Massachusetts 2* (3 q.h.)

Continuation of BIO 4185. *Prereq. BIO 4185 or equiv.*

BIO 4190 Microbiology 1 (3 lab., 3 q.h.)

Morphology and biochemistry of bacteria. *The required laboratory is BIO 4200, Lab for Microbiology 1 (Laboratory fee). Prereq. BIO 4105 or equiv.*

BIO 4191 Microbiology 2 (3 q.h.)

Survey of pathogenic microorganisms. *The required laboratory is BIO 4201, Lab for Microbiology 2 (Laboratory fee). Prereq. BIO 4190 or equiv.*

BIO 4192 Microbiology 3 (3 q.h.)

Examination of the characteristics and role of microorganisms in the environment. *The required laboratory is BIO 4202, Lab for Microbiology 3 (Laboratory fee). Prereq. BIO 4191 or equiv.*

BIO 4224 Ecology 1 (3 q.h.)

Environmental factors, such as the soil system, water, the atmosphere, temperature, light, wind, and pressure; physico-chemical factors such as carbon dioxide, nitrogen, and mineral nutrients; the habitat; and the distribution of plants and animals in the world according to temperature and precipitation. *Prereq. BIO 4105 or equiv.*

BIO 4225 Ecology 2 (3 q.h.)

Study of the ecosystem; ecological niches; producers, consumers, and decomposers; the pond, desert, forest, and seashore ecosystems; energy cycle and efficiency of energy utilization; mass, weight, and energy pyramids. *Prereq. BIO 4224 or equiv.*

**Taught odd-numbered academic years.*

BIO 4226 Ecology 3 (3 q.h.)

Study of population ecology, biotic communities and population growth, relations between the species, symbiosis, competition, predation, and succession. *Prereq. BIO 4225 or equiv.*

BIO 4235 Genetics 1 (3 q.h.)

Topics include nucleic acid structure, replication of genetic materials, mitosis, meiosis, and Mendelian inheritance. *Prereq. BIO 4103.*

BIO 4236 Genetics 2 (3 q.h.)

Examination of mutation, regulation of gene expression, population genetics, engineering, and genetics of bacteria and viruses. *Prereq. BIO 4235.*

BIO 4237 Genetics Laboratory (4 lab., 2 q.h.)

Laboratory exercises involving principles of Mendelian inheritance, linkage, and crossing-over. Classical genetics utilizing *Drosophila*; biochemical studies utilizing *Neurospora* and *E. coli*. (Laboratory fee.) *Prereq. BIO 4236 or equiv.*

BIO 4246 Cell Biology 1 (3 q.h.)

Chemical composition, structure of cells and organelles, transport processes, cell motion and excitability, and growth. *Prereq. BIO 4103, BIO 4236, and CHM 4263 or equiv.*

BIO 4247 Cell Biology 2 (3 q.h.)

Cellular energy supply, enzyme function, respiration and metabolism, photosynthesis and other synthetic pathways, and control of cellular processes. *Prereq. BIO 4246 or equiv.*

BIO 4248 Cell Biology Laboratory (4 lab., 2 q.h.)

Laboratory techniques in cell biology, microscopy, structure and chemical composition of cells, enzyme measurements, photosynthesis, respiration, active transport, and growth. (Laboratory fee.) *Prereq. BIO 4247 or equiv.*

BIO 4258 Advanced Human Physiology 1 (3 q.h.)

Study of human physiology emphasizing cellular processes and underlying organ functions and the interactions and control of organ systems. Selected physiological topics are considered as

**Taught odd-numbered academic years.*

time allows. *Prereq. BIO 4177 and CHM 4113 or equiv.*

BIO 4259 Advanced Human Physiology 2 (3 q.h.)

Cardiovascular considerations; the immune system; the AIDS problem. Biological control mechanisms; selected endocrine topics. *Prereq. BIO 4258.*

BIO 4260 Cell, Tissue and Organ Culture (3 q.h.)

General principles and technique of tissue culture and preservation. The behavior of cells in culture, cell lines and relevant media are discussed. Methodology of animal and plant culture and its use in virology, cancer research and radiobiology.

BIO 4320 Medical Microbiology (4 q.h.)

(Summer Quarter only) Major characteristics of disease-producing organisms. *The required laboratory is BIO 4330, Lab for Medical Microbiology (Laboratory fee), which generally meets on a different night. Prereq. BIO 4192 or professional laboratory experience in bacteriology.*

BIO 4374 Histology 1 (3 q.h.)

Examination of cell structure and tissue organization, including epithelium, muscle, and connective tissue. Also covers cartilage, bone, and nervous system. *The required laboratory is BIO 4384, Lab for Histology 1 (Laboratory fee). Prereq. BIO 4175.*

BIO 4375 Histology 2 (3 q.h.)

Examination of the blood, skin, cardiovascular and lymphatic systems, as well as the gastrointestinal system, including the oral cavity, GI tract, liver, and gall bladder. *The required laboratory is BIO 4385, Lab for Histology 2 (Laboratory fee).*

BIO 4376 Histology 3 (3 q.h.)

Examination of the respiratory, urinary, and male and female reproductive systems, as well as the endocrine glands and the eyes and ears. *The required laboratory is BIO 4386, Lab for Histology 3 (Laboratory fee).*

BIO 4411 Embryology and Development 1 (3 q.h.)

(Winter Quarter, offered on an every other year schedule. **This course will**

be offered in the 1990-91 academic year.) Topics include gametogenesis, reproductive physiology, fertilization, blastulation, gastrulation, and early embryogenesis. Required laboratory BIO 4421, emphasizes invertebrate and amphibian embryology. *Prereq.* BIO 4374 or equiv.

BIO 4412 Embryology and Development 2 (3 q.h.)

(Spring Quarter, offered on an every other year schedule. **This course will be offered in the 1990-91 academic year.**) Topics include morphogenesis and pattern formation, placentation, and organogenesis. Required laboratory BIO 4422, emphasizes chick and pig embryology. *Prereq.* BIO 4411 or equiv.

BIO 4420 Biomedical Illustration (4 q.h.)

Examines the uses of biomedical illustration in the preparation of visual materials including teaching visuals, illustrations for publications, models and graphics for films and television. Anatomy and skeletal characteristics will be surveyed including specific skills and techniques necessary to draw three-dimensional subjects from direct observation, interpreting them in two-dimensional media. In addition to discussions and demonstrations, students will undertake individual projects in preparing materials for publications, scientific illustration and preparation of educational materials. *Prereq.* ART 4121, ART 4122, ART 4123 or permission of the instructor.

BIO 4441 Parasitology (4 q.h.)

(Spring Quarter only) Parasitic organisms, particularly those affecting humans and domestic animals, and their life cycles, modes of transmission, and diagnosis and treatment. Includes microscopic examination of prepared and live material. *The required*

laboratory is BIO 4451, Lab for Parasitology (Laboratory fee). Prereq. BIO 4103 or instructor's permission.

BIO 4455 Introduction to Biotechnology (3 q.h.)

Examines the historical development, basic technologies, and commercial potential of biotechnology. Basic biological concepts are first reviewed including the steps leading to the 20th century revolution in molecular and cell biology. The technology of recombinant DNA, monoclonal antibody production, and nucleic acid probe development are outlined along with their therapeutic, diagnostic, and experimental uses. Newer, emerging technologies and applications are discussed where appropriate. The commercial state of the art and its developmental marketing problems are included. *Prereq.* college level chemistry and biology, or permission of instructor.

BIO 4461 Immunology (4 q.h.)

Biological, chemical, and physical attributes of antigens and antibodies, together with their serological interactions. *The required laboratory is BIO 4462, Lab for Immunology (Laboratory fee), which generally meets on a different night. Prereq.* BIO 4191, CHM 4263, or equiv.

BIO 4700 Advanced Tutorial 1 (4 q.h.)

Opportunity to take upper-level course independently. See page 21 for details. *Prereq.* 87 q.h.

BIO 4701 Advanced Tutorial 2 (4 q.h.)

See BIO 4700.

BIO 4801 Independent Study 1 (3 q.h.)

Opportunity to undertake special research. See page 21 for details. *Prereq.* 96 q.h. and 3 q.p.a.

BIO 4802 Independent Study 2 (3 q.h.)

See BIO 4801.

BUSINESS LAW

BL 4101 Law 1 (3 q.h.)

Introduction to the legal system. Study of the nature, formation, and essential elements of contracts, including performance and remedies for breach. Also covers agency law, including the rights and duties of principal and agent, the scope of authority, and relationships to third persons.

BL 4102 Law 2 (3 q.h.)

Sales as governed by the Uniform Commercial Code, including the law of warranty, business organizations, partnerships, corporations, and other important business forms. *Prereq.* BL 4101.

BL 4103 Law 3 (3 q.h.)

Commercial paper, the function of negotiability, bank checks and promissory notes, real property, personal property, bailments, bankruptcy, and secured transactions. *Prereq.* BL 4102.

BL 4105 Law (Intensive) (6 q.h.)

Same as BL 4101 and BL 4102.

BL 4110 Law for Managers (3 q.h.)

Study of legal problems for managers including rights and duties in the employment relationship, acquisition of

computer software and hardware, effective use of legal counsel, personal liability issues for managers, credit and collection law, and other selected topics of interest.

BL 4115 Law and Social Issues (3 q.h.)

Structure and dynamics of the American legal system through analysis of selected cases dealing with social issues.

BL 4120 Law for Personal Planning (3 q.h.)

Legal aspects of personal and family planning, including consumer rights, wills and estate planning, marital law, real estate purchase, tenants' rights, and other selected topics of interest.

BL 4316 International Business Law (3 q.h.)

Surveys the leading principles in international business law as applied in decisions of domestic and international courts; the sources, development and authority of international business law, such as the laws of the European Common Market; and the making, interpretation and enforcement of treaties, and the organization and jurisdiction of international tribunals.

CHEMISTRY

CHM 4105 Chemistry and the Environment (3 q.h.)

Fundamental chemical principles, using examples from the geochemical and the internal environments of human beings as well as the home, the farm, and the workplace. No laboratory required.

CHM 4111 General Chemistry 1 (3 q.h.)

Fundamental chemistry concepts, such as symbols, formulas, equations, atomic weights, and calculations based on equations. Also covers gases, liquids, solutions, and ionization. *The required laboratory is CHM 4117, Lab for General Chemistry 1 (Laboratory fee). Prereq.* MTH 4112 or equiv. (can be taken concurrently).

CHM 4112 General Chemistry 2 (3 q.h.)

Atomic structure, bonding, molecular structure, oxidation and reduction reactions, and equilibrium and kinetics. *The required laboratory is CHM 4117, Lab for General Chemistry 2 (Laboratory fee). Prereq.* CHM 4111 or equiv.

CHM 4113 General Chemistry 3 (3 q.h.)

Thermochemistry and electrochemistry, acids, bases, and solubility products, nuclear chemistry, introductory organic chemistry, and biochemistry. *The required laboratory is CHM 4119, Lab for General Chemistry 3 (Laboratory fee). Prereq.* CHM 4112 or equiv.

CHM 4221 Analytical Chemistry 1 (3 q.h.)

Principles of gravimetric and titrimetric analysis (wet chemistry). Introduces statistics as applied to analytical chemistry and examines such topics as chemical equilibrium and acid-base equilibria in simple and complex systems. Gravimetric and titrimetric experiments are performed. *The required laboratory is CHM 4227, Lab for Analytical Chemistry 1 (Laboratory fee). Prereq.* CHM 4113 or equiv.

CHM 4222 Analytical Chemistry 2 (3 q.h.)

Continuation of CHM 4221. Covers complex formation titration, precipita-

tion titrations, and oxidation-reduction titrations. Electrical methods of analysis, such as potentiometry, electrolysis, coulometry, and polarography, are discussed and titrimetric analyses and experiments involving electricity are performed. *The required laboratory is CHM 4228, Lab for Analytical Chemistry 2 (Laboratory fee). Prereq. CHM 4221 or equiv.*

CHM 4223 Analytical Chemistry 3 (3 q.h.) Spectrophotometry as a method of analysis, including ultraviolet, visible, infrared, and fluorescence methods; flame emission; and atomic absorption. Studies of solvent extractions and chromatographic methods of separation, such as gas-liquid chromatography and liquid chromatography. *The required laboratory is CHM 4229, Lab for Analytical Chemistry 3 (Laboratory fee). Prereq. CHM 4222 or equiv.*

CHM 4224 Analytical Chemistry (4 q.h.) (Summer quarter only) Principles and theories of volumetric, gravimetric, and instrumental analysis. Application made in the laboratory with analyses of unknown samples. *The required laboratory is CHM 4226, Lab for Analytical Chemistry (Laboratory fee). Prereq. CHM 4113 or equiv.*

CHM 4261 Organic Chemistry 1 (4 q.h.) Nature of carbon in organic compounds. General principles of structure, nomenclature, preparation, uses, and reactions of aliphatic hydrocarbons: alkanes, alkenes, alkynes, dienes, cycloalkanes. Position and geometric isomerism. Introduces free radical and ionic mechanisms of reactions. The laboratory generally deals with the preparation and properties of compounds discussed in the lecture. *The required laboratory is CHM 4267, Lab for Organic Chemistry 1 (Laboratory fee). Prereq. CHM 4113 or equiv.*

CHM 4262 Organic Chemistry 2 (4 q.h.) Structure of benzene, electrophilic aromatic substitution reactions. General principles of structure, nomenclature, preparation, uses, and reactions of the various types of organic compounds, including alcohols, alkyl and aryl halides, ethers and

epoxides, and carboxylic acids. Also covers optical isomerism and introductory chemical kinetics. The laboratory generally deals with the preparation and properties of compounds discussed. *The required laboratory is CHM 4268, Lab for Organic Chemistry 2 (Laboratory fee). Prereq. CHM 4261 or equiv.*

CHM 4263 Organic Chemistry 3 (4 q.h.) Continuation of CHM 4262. Emphasizes the application of chemical conversions to synthetic problems. Includes functional derivatives of carboxylic acids, sulfonic acids and their derivatives, amines, diazonium compounds, phenols, aldehydes, and ketones. The laboratory generally deals with the preparation and properties of compounds discussed. *The required laboratory is CHM 4269, Lab for Organic Chemistry 3 (Laboratory fee). Prereq. CHM 4262 or equiv.*

CHM 4271 Introduction to Immunodiagnostics (3 q.h.)

Fundamentals of immunodiagnostics with emphasis on the application of principles to nursing, medical laboratory science, and biology. *Prereq. CHM 4113, BIO 4103 or equiv.*

CHM 4321 Instrumental Analysis 1 (3 q.h.) Basic theory of electrochemistry and electrochemical methods of analysis, including electrode and cell potentials, potentiometric titrations, direct potentiometry (pH meters and specific ion electrodes), coulometry, voltammetry, polarography, electrogravimetry, and conductometric methods. *Prereq. CHM 4223 or equiv. (This course may serve as preparation for certain graduate courses.)*

CHM 4322 Instrumental Analysis 2 (3 q.h.) Basic theory of absorption and emission spectroscopy, including ultraviolet and visible spectroscopy, molecular fluorescence and phosphorescence, atomic absorption spectroscopy (flame, arc, spark, and plasma), and infrared and X-ray spectroscopy. *Prereq. CHM 4321 or equiv. (This course may serve as preparation for certain graduate courses.)*

CHM 4323 Radiochemistry (3 q.h.)

(Offered on alternate years with CHM 4333 Chemical Separations) Basics of radioisotopes, including basic physics; the atomic nucleus; properties and production of radioisotopes; properties of nuclear radiation; dose calculations; ionization chambers; proportional, Geiger-Muller, and crystal and liquid scintillation counters; and the statistics involved in counting radiation. *Prereq.* CHM 4322 or *equiv.*

CHM 4333 Chemical Separations (3 q.h.)

(Offered on alternate years with CHM 4323 Radiochemistry) Theory of solvent extractions and chromatographic separations; gas chromatography, liquid chromatography, high liquid chromatography, thin layer chromatography, paper chromatography. Chromatographic detectors. Mass spectrometry as utilized in tandem with chromatography methods for analysis of structures.

CHM 4371 Biochemistry 1 (3 q.h.)

Cellular organization, pH buffers, and the biochemistry of amino acids, proteins, enzymes, and vitamins. *Prereq.* CHM 4263 or *equiv.*

CHM 4372 Biochemistry 2 (3 q.h.)

Biochemistry of carbohydrates, lipids, and nucleic acids; bioenergetics; and the metabolism of carbohydrates. *Prereq.* CHM 4371 or *equiv.*

CHM 4373 Biochemistry 3 (3 q.h.)

Metabolism of lipids, amino acids, and nucleotides and the biosynthesis of proteins, DNA, and RNA. *Prereq.* CHM 4372 or *equiv.*

CHM 4381 Physical Chemistry 1 (3 q.h.)

Thermodynamics, thermochemistry,

First and Second Laws, entropy, and free energy in spontaneous processes. *Prereq.* CHM 4113 or *equiv.*

CHM 4382 Physical Chemistry 2 (3 q.h.)

Chemical equilibria, acids and bases, electrochemistry, colligative properties, phase diagrams, thermodynamics of multicomponent systems, and kinetic molecular theory. *Prereq.* CHM 4381 or *equiv.*

CHM 4383 Physical Chemistry 3 (3 q.h.)

Kinetics, quantum chemistry, and photochemistry. *Prereq.* CHM 4382 or *equiv.*

CHM 4391 Introduction to Recombinant DNA Technology (3 q.h.)

Principles of gene manipulation in bacteria and yeasts. Principles and methods of gene cloning and splicing.

CHM 4392 Affinity Chromatography in Biological Separations (3 q.h.)

Principles and practice of affinity chromatography as utilized in separation and purification of biomolecules. *The required laboratory is CHM 4394, lab for Affinity Chromatography (Laboratory Fee).* *Prereq.* CHM 4263 or *equiv.*

CHM 4700 Advanced Tutorial 1 (4 q.h.)

Opportunity to take upper-level course independently. See page 21 for details. *Prereq.* 87 q.h.

CHM 4701 Advanced Tutorial 2 (3 q.h.)

See CHM 4700.

CHM 4801 Independent Study 1 (3 q.h.)

Opportunity to take special research. See page 21 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

CRIMINAL JUSTICE**CJ 4101 Administration of Criminal Justice (3 q.h.)**

Survey of the contemporary criminal justice system from initial contact with the offender through prosecution, disposition, incarceration, and release to the community. Emphasis on major systems of social control: police, corrections, juvenile justice, mental health systems, and their policies and practices relative to the offender. Legal,

empirical, and sociological materials covered.

CJ 4102 Crime Prevention and Security (3 q.h.)

Introduction to the concept that all citizens are responsible for preventing crime and promoting security. Content ranges from the theoretical level to community, organization, and personal strategies necessary to prevent crime.

CJ 4103 Criminology (3 q.h.)

Classical and contemporary criminological theories. Examines their historical development and empirical bases, as well as their significance to the criminal justice process and the rehabilitation/deterrence/punishment of offenders.

CJ 4104 Dimensions of Crime (3 q.h.)

An examination of empirical knowledge about crime: the magnitude of the crime problem in the United States; characteristics of those who commit crimes; information about dangerous repeat offenders; characteristics of victims; and financial costs of crime to neighborhoods and communities. Assessment of the strengths and weaknesses of current crime measurement techniques, especially the Uniform Crime Reports and victimization surveys.

CJ 4105 Computer Applications in Criminal Justice (3 q.h.)

A survey of computer technology applications to criminal justice research and decision-making in criminal justice agencies. Topics include statistical and data-base software, data-base management, word processing, computer mapping, forecasting techniques, simulations and modeling, and mainframe relations.

CJ 4106 Criminal Justice Research 1 (3 q.h.)

A survey of methods for basic and applied research in criminal justice, combining statistics and research methods. Examines research techniques in criminal justice including interviews, questionnaires, observations, and scales for survey analysis. Issues of measurement and casual reasoning examined in regard to criminal justice research.

CJ 4107 Criminal Justice Research 2 (3 q.h.)

An extension of Criminal Justice Research 1. Focuses on the uses of statistics, with special reference to use of data from the field of criminal justice. Covers basic descriptive statistics, including measures of central tendency, tests of significance, probability, sampling, and methods of forecasting. Concentrates on research application by stressing discussion of

the general role of research in the discipline and specific contributions advanced by studies in the field.

Prereq. CJ 4106.

CJ 4108 Criminal Law and Procedure 1 (3 q.h.)

Examination of the concepts, responsibilities, and liabilities of criminal law and procedure. Reviews the evolution of the criminal law system. Topics include an analysis of substantive criminal law and the procedural process, as well as basic definitions; discussions of interaction between federal and state constitutions as they relate to criminal law.

CJ 4109 Criminal Law and Procedure 2 (3 q.h.)

Application of vital constitutional and statutory concepts, including selected statutory crimes, law of arrest, right to counsel, search and seizure, and applicable criminal procedures. Students are expected to be familiar with basic concepts as well as changing interpretations so that they can cite cases to support their conclusions. *Prereq. CJ 4108.*

CJ 4110 Constitutional Law (3 q.h.)

The history and development of the U.S. Constitution and Amendments using text commentary and case analysis. Topics include the Commerce Clause, procedural due process, state's rights, individual rights and civil liberties, the concept of federal supremacy, and state constitutions. *Prereq. CJ 4109.*

CJ 4114 Introduction to Law 1 (3 q.h.)

Provides an introduction to the law and the legal system of the United States. Sets forth the fundamentals of our legal process and provides a summary description of both the private and public law system. Presents an overview of the traditional structure, as well as the basic principles of law.

CJ 4115 Introduction to Law 2 (3 q.h.)

Continues the material presented in CJ 4114. Introduces basic tort and contract principles, administrative law, and governmental regulation of business, topics of particular concern to criminal justice professionals in

both the public and private sectors, as well as to those students concentrating in legal studies. *Prereq.* CJ 4114.

CJ 4118 Juvenile Law (3 q.h.)

Introduces students to the fundamental case law and theory of Juvenile Law. Students study care and protection cases (commonly called abuse and neglect cases); delinquency proceedings; status offense cases, and transfer/waiver cases.

CJ 4201 Criminal Investigation 1 (3 q.h.)

The evolution of contemporary investigative techniques. Topics include investigative effectiveness and organization, and modern investigative techniques, especially as they relate to particular crimes such as arson, sexual offenses, larceny, burglary, robbery, forgery, and homicide.

CJ 4202 Criminal Investigation 2 (3 q.h.)

Continuation of Criminal Investigation 1. Focuses on staffing the investigation unit, informational management, control of evidence, establishment of investigative priorities; fiscal restraints, and the relationship between criminal investigation and patrol and special units. Examines special police operations such as electronic surveillance, raids, and undercover operations; affidavit construction, court preparation, and the use of scientific methods; and Federal law with regard to due process and other constitutional protections. *Prereq.* CJ 4201.

CJ 4203 Criminalistics 1 (3 q.h.)

Survey of the elements of microscopy, spectroscopy, and basic chemistry as they apply to the study of materials that comprise physical evidence. Covers the procedures for searching, sketching, and photographing crime scenes as well as the recognition, collection, marking, and handling of physical evidence, emphasizing the importance of maintaining the chemical integrity of each sample. Studies the types of analysis, their value and limitations with regard to glass, soil, hairs and fibers, firearms, toolmarks, and questioned documents.

CJ 4204 Criminalistics 2 (3 q.h.)

An introduction to the analysis of biological items of physical evidence collected at the scene of the crime or submitted for laboratory examination, and to the fields of serology and toxicology. Covers methods of collecting samples and the value of blood distribution patterns, as well as laboratory techniques used to identify and characterize blood stains and other body fluids. Pharmacology and toxicology of medical and chemical substances having potential for misuse and abuse are studied. Includes laboratory demonstrations and practical exercises to examine types of physical evidence, including gunshot residue, paints and polymers, and arson and explosive residues. *Prereq.* CJ 4203.

CJ 4205 Patrol Theory and Administration 1 (3 q.h.)

History of the evolution of patrol practices; the changing patrol function over time; the history of patrol management and supervision; the development of preventive patrol and rapid response to calls for service; theories of patrol allocation; the influence of operations research; the development of community relations as an adjunct to patrol.

CJ 4206 Patrol Theory and Administration 2 (3 q.h.)

Contemporary patrol developments and functioning: directed patrol, team and community policing, the re-emergence of foot patrol, the legacy of community relations; neighborhood beat construction, patrol management and supervision; and current patrol research.

CJ 4207 Comparative Police Systems (3 q.h.)

Comparative study of police systems in Anglo-Saxon, Continental, Asian, Russian, African, and other cultural traditions with focus on the influence of nineteenth-century English and twentieth-century American police traditions on policing systems in other cultures and countries.

CJ 4208 Police Operations (3 q.h.)

A general survey of police operational procedures, including traffic safety and control, report writing, interviews and interrogations, and identification and records.

CJ 4209 Police Management 1 (3 q.h.)

Introduction to the philosophy and theories of management in policing. Historical view of the development of "professional/bureaucratic" managerial approach in policing. The development of organizational strategy; and understanding and managing the external environment within which police operate.

CJ 4210 Police Management 2 (3 q.h.)

Internal management of police organizations: policy development, implementation, maintenance of ongoing operations, and evaluation of program outcomes.

CJ 4211 Police and Social Problems (3 q.h.)

Investigation of police functioning with regard to contemporary social problems: drugs, prostitution, domestic assault, gangs, serial murderers, dangerous offenders, illegal aliens, and others, with a special focus on related research into police functioning.

CJ 4212 Police Community Relations (3 q.h.)

The role and function of police with both individuals and groups, including minority groups; police responsibilities regarding civil rights, civil disorders, and public protection.

CJ 4213 Police Discretion (3 q.h.)

The nature and impact of discretion as it relates to police decision-making. Covers the forms of police discretion and ways in which it can be structured, confined, and checked. Students examine and learn to analyze sample police department policies and study different methods for their development. Students also study the relation of discretion to controlling police behavior and police corruption.

CJ 4301 American Correctional System (3 q.h.)

A critical analysis of the American system of corrections. Covers important historical developments and the

range of treatment and/or punishment options available to government, including prisons, jails, reformatories and community treatment programs. Probation and parole are considered as an integral part of corrections. Current correctional philosophy and treatment approaches on federal, state, and local levels of government are assessed. The interrelated nature of all aspects of corrections is emphasized, with particular focus on policy analysis and decision-making.

CJ 4302 Correctional Administration 1 (3 q.h.)

An intensive examination of the American correctional process. Programs, services, standards, methods of service delivery, and contracting procedures are analyzed. Critical issues in personnel administration and management are discussed, as are the allocation of scarce resources and staff development and training programs. Stresses motivation, productivity, and accountability in corrections and the role of community outreach and inter-face programs and volunteer services. *Prereq. CJ 4301.*

CJ 4303 Correctional Administration 2 (3 q.h.)

Continuation of intensive examination of the correctional process, with focus on special problems facing correctional administrators. Topics include the management of offenders with special needs (dangerous and/or violent offenders and inmates with histories of substance abuse); management and control of prison violence; and preventive techniques and programs. Also explored are institutional management of illegal immigrants and other special prisoners, as well as the special needs of female offenders. *Prereq. CJ 4302.*

CJ 4304 Jail Administration and Management (3 q.h.)

Study of local adult correctional institutions ranging from police lock-ups to jails and houses of corrections. Topics include administrative, management, and security issues; intake, regional, and network approaches; local versus state control; offender classification, programs, residential care, inspection, and standards;

pretrial detention; staffing patterns; interface with courts and law enforcement; release programs; emergency management; and suicide prevention.

CJ 4305 Case Management and Correctional Services (3 q.h.)

An overview of treatment and rehabilitative work conducted in jail and prison environments. Basic counseling concepts and techniques, individual and group therapy, and institutional services are discussed. Case studies and class projects used to illustrate offender and inmate management in a variety of settings. Students study a range of innovative approaches in corrections and assess their fiscal and personnel requirements, and effectiveness. *Prereq. CJ 4301.*

CJ 4306 Correctional Security Methods and Technology (3 q.h.)

Examination of the technology and management methods that provide a secure, safe, and humane environment in which to incarcerate offenders while protecting both inmates and staff. A primary course objective is creating a correctional environment that supports productive human relations.

CJ 4307 The Rights of Offenders and Prisoners (3 q.h.)

Study of the rights of persons under correctional control. Examines traditional methods and assesses the magnitude and pace of judicial intervention in corrections. Topics include access to courts and legal services; health and medical care; searches; nondiscriminatory treatment; rehabilitation; retention and restoration of rights; rules of conduct, disciplinary procedures; grievance procedures; exercise of religious beliefs and practices; and remedies for violations of an offender's rights.

CJ 4308 Correctional Counseling (3 q.h.)

Survey of basic counseling concepts and principles, individual and group therapy carried on in the correctional field, and institutional services. Case studies and projects. *Prereq. CJ 4301.*

CJ 4309 Comparative Correctional Systems (3 q.h.)

Correctional systems and practices in

selected jurisdictions in the United States and other countries. Introduces students to innovative approaches in community corrections, local correctional institutions, prisons, alternatives to incarceration practices, rehabilitative and reintegrative programs, and improved management approaches. *Prereq. CJ 4301.*

CJ 4310 Community Corrections (3 q.h.)

The concept of community corrections from historical, philosophical, and pragmatic perspectives, and analysis of program options serving as alternatives to imprisonment or institutionalization. Discussions of program activities range from work and study release programs, family visiting furloughs, community-based correctional efforts aimed at helping offenders become law-abiding citizens. Topical issues include private and public programs, control and surveillance issues, residential and non-residential programs, marshalling and coordinating community resources, and volunteer involvement. Program and cost-effectiveness of community corrections, community safety, and managerial issues are also discussed. *Prereq. CJ 4301.*

CJ 4311 Probation and Parole (3 q.h.)

Introduction to probation and parole as dispositions, systems or subsystems, processes, and offender statuses. Includes the history of promotion and parole, their conditions and revocation procedures, offender eligibility requirements, supervision styles, due process issues, and prediction and measurements of effectiveness. The role of volunteers, and probation and parole officer responsibilities also discussed. Introduces students to presentence investigations, shock probation, probation subsidy, expansion of probation into pretrial and restitution programs, and to current debates on the governmental framework of probation and parole, parole boards, and parole hearings. *Prereq. CJ 4301.*

CJ 4312 Correctional Planning and Management (3 q.h.)

Issues and techniques of analysis, planning, and evaluation in corrections.

Demonstrates how a correctional organization's climate, structure, and leadership style affect its responses to changing environmental conditions. Topics include long-, intermediate-, and short-range planning for administrative and operation functions; regional, state, and local planning techniques; capital and operations budgeting procedures; organizational goals and objectives; key social, economic, and functional influences; the development of monitoring, assessment, and evaluation procedures; corrections interfaces with the legislative and judicial branches of criminal justice; and the development of information systems vital to the improvement and effectiveness of the corrections mission. *Prereq. CJ 4301.*

CJ 4313 Correctional Institutions (3 q.h.)

The historical development of correctional institutions in the United States and present trends in correctional practices with focus on institutions. Topics include the characteristics of correctional facilities; issues of deterrence, rehabilitation, and reintegration, and the social environment for inmates and staff. Students discuss security issues, reception and classification, institutions for women, disciplinary and grievance procedures, and prerelease programs, as well as education and vocational training, religious, recreation, and counseling services, prison labor and industries. *Prereq. CJ 4301.*

CJ 4314 Classification of Offenders (3 q.h.)

Surveys major methods of classifying offenders and constructing offender typologies. Topics include classification for risk, security, management, and program assignments within institutions and for probation, parole, and related community programs. The reliability and validity of classification methodologies are assessed, as are their relevance to explaining criminal and deviant behavior. Also examined are classification systems at the local and state levels, suicide prevention techniques, and classification for reintegrative purposes, such as education, work-release, and furlough programs. *Prereq. CJ 4301.*

CJ 4403 Introduction to Security (3 q.h.)

The organization and administration of security and loss prevention programs in industry, business, and government. Emphasizes the protection of assets, personnel, and facilities, and the relations between security organizations and government agencies.

CJ 4404 Industrial Safety and Fire Prevention (3 q.h.)

Problems, methods, and technology in establishing safe working environments. Emphasizes the prevention of accidents and the effects of natural disasters with special focus on hazardous substance risks. *Prereq. CJ 4403.*

CJ 4405 Current Security Problems (3 q.h.)

Contemporary security problems affecting society including, but not limited to, white-collar crime, drug abuse, theft control, espionage and sabotage, and terrorism. *Prereq. CJ 4403.*

CJ 4406 Security Administration 1 (3 q.h.)

The historical basis of the security management function and the development of the field in general and its various specialties. Examines concepts of organizational security and risk-management methods. *Prereq. CJ 4403.*

CJ 4407 Security Administration 2 (3 q.h.)

Organization, administration, and management of the security function, including the systems approach to security operations. Focuses on planning, organizing, staffing, directing, controlling, representing, and innovating. The manager's responsibility is also explored.

CJ 4408 Legal Aspects of Security Management and Operations (3 q.h.)

Provides a comprehensive examination of the legal environment and issues impacting security operations and management. Elements of criminal, civil, property, regulatory, and business law are analyzed from the perspective of organizational security management concerns. Includes legal basis of security practices, civil liability, corporate security, investigations, labor law, industrial espionage, governmental security issues, and other relevant topics. *Prereq. CJ 4403, CJ 4406, and CJ 4407.*

CJ 4409 Physical Security Methods and Technology 1 (3 q.h.)

An examination of the management methods and technology that comprise a cost-efficient security program. Students develop planning and management skills to integrate personnel, equipment, and procedures with the goal of organizational security. Concentrates on the technologies of barriers, intrusion detection, security containers, and access control. *Prereq. CJ 4403.*

CJ 4410 Physical Security Methods and Technology 2 (3 q.h.)

A continuation of CJ 4409. Concentrates on the technologies of closed-circuit television, computer-assisted systems, information security, communications, merchandise protection, personnel protection, natural hazard detection and control, and aids to investigations. *Prereq. CJ 4409.*

CJ 4411 Electronic Information Security (3 q.h.)

Survey of the complex and developing security problems inherent in the use of electronic information systems. Provides a comprehensive examination of the management methods and technology used to counter the security risks related to the use of computers, word processors, and other communication devices and methods. *Prereq. CJ 4403.*

CJ 4501 Patterns of Criminal Behavior (3 q.h.)

Examination of the theories and research on the formation, structure, and basis for criminal behavior patterns. Surveys current knowledge concerning the various forms of criminal behavior. Topics include the construction of types of crime, the formulation and use of typologies of crime based on criminal behavior systems, and critical research on a range of criminal behavior patterns. *Prereq. CJ 4103.*

CJ 4502 Fire Investigation, Arson, and Explosives (3 q.h.)

Introduction to examination and behavior of fire, including fire-related phenomena such as convection, radiation, conduction, and ignition. Arson,

explosions, asphyxiations, and combustibility are addressed, with emphasis on the chemistry of other combustible materials. Sessions include the recovery, analysis, and evaluation of physical evidence from fires and explosions.

CJ 4503 Forensic Laboratory (3 q.h.)

A hands-on laboratory course focusing on individual experimentation. Surveys the basic examinations and techniques performed in a crime laboratory. Topics include general microscopy, hairs and fibers, blood and other body fluids, paint, glass, soil, fingerprints, gunshot residue, toxicology, questioned documents, and firearm and toolmark examinations. *Prereq. CJ 4203 and CJ 4204.*

CJ 4504 Juvenile Justice 1 (3 q.h.)

Examination of the contemporary juvenile justice system, with focus on the key decision points within the juvenile justice system including jurisdiction, police, detention, court intake, adjudication, disposition, and aftercare. Critical issues facing the juvenile justice system components are discussed.

CJ 4505 Juvenile Justice 2 (3 q.h.)

Continuation of material discussed in CJ 4504. In particular, consideration is given to the history of juvenile justice in the U.S.; the major reforms of the juvenile justice system (diversion, the development of due process, decriminalization of status offenders, deinstitutionalization, and waiver to adult court); and future trends in juvenile justice. *Prereq. CJ 4504.*

CJ 4506 Crime Victims (3 q.h.)

Examination of current theories and research relating to victims of crime. Particular attention to special victim groups such as children, the elderly, and women. Victim interactions with the criminal justice system are explored. Current victim initiatives such as restitution, mediation, compensation, and victim rights legislation are also assessed. *Prereq. CJ 4101 and CJ 4103.*

CJ 4507 Organized Crime (3 q.h.)

The nature and problems of organized crime, its causes and effects,

comparative and historic roots, and activities, organization, and economics. Considers possible solutions and the scope of techniques used in combating organized crime.

CJ 4508 Crime Scene Investigation (3 q.h.)

A competent search of a crime scene demands specialized training. This course covers certain basic considerations, guidelines, and procedures that help the crime scene technician avoid oversight, ensure thoroughness of search, and comply with both the legal and scientific pertaining to the use of physical evidence. The procedures for recording the crime scene--i.e., note-taking, sketching, and photography--as well as the basic steps that minimize the omission or contamination of evidence are studied in detail.

CJ 4509 White-Collar Crime (3 q.h.)

Basic survey of white-collar crime. The nature and extent of white-collar crime, the social-psychological makeup of white-collar crime typologies, present efforts directed toward its control, and interagency and jurisdictional problems and the benefits of cooperation.

CJ 4510 Terrorism (3 q.h.)

An overview of what terrorism is and why it has become so popular. Topics include the role of news media, political consequences of terrorism, the military as a resource, and the role of the hostage.

CJ 4511 Survey of Criminal Evidence (3 q.h.)

The fundamentals of criminal trial procedure and the rules of evidence as they apply to the trial of a criminal case. Students read and brief criminal court cases. *Prereq. CJ 4108 and CJ 4109.*

CJ 4512 Women and the Criminal Justice System (3 q.h.)

Introduction to issues relating to roles taken by women involved with the criminal justice system and to the system's various responses to women in these roles. Specific focus on women as victims of crime, as offenders, and as practitioners.

CJ 4701 Independent Study 1 (3 q.h.)

Opportunity to undertake special research. See page 21.

CJ 4702 Independent Study 2 (3 q.h.)

See *CJ 4701*.

CJ 4703 Independent Study 3 (3 q.h.)

See *CJ 4701*.

CJ 4805 Advanced Tutorial 1 (3 q.h.)

Opportunity to take upper-level course independently. See page 21 for details.

CJ 4806 Advanced Tutorial 2 (3 q.h.)

See *CJ 4805*.

CJ 4811 Advanced Tutorial Intensive (6 q.h.)

Opportunity to take upper-level course sequence independently. See page 21 for details.

COMPUTER LITERACY

COM 4101 Foundations of Computer Literacy (4 q.h.)

Introduction to computers, including data-base management, word processing, systems analysis and design, soft-

ware packages, artificial intelligence, and trends in specialized types of office automation. Hands-on laboratories reinforce lectures.

DRAMA

DRA 4101 Introduction to Theatre (3 q.h.)

How a theatrical performance is made through the eyes of those who make it: writers, producers, actors, designers, and audience. Designed to increase the student's awareness of theatre as a business as well as to provide a basis for enjoyment of theatre as an art form dealing with ideas and emotion. Visits to local theatres and viewing of perfor-

mances in the Boston area. Guest lectures by practicing professionals. Cost of theatre tickets not included in tuition.

DRA 4120 Acting for the Non-Actor (3 q.h.)

Shakespeare said "All the world's a stage. . ." We are all actors in our private and professional lives. Basic acting principles and performance

experiences can benefit anyone who interacts with other people. This course deals with stress, relaxation, presentation of self, status in relationships, and performance anxieties. Acting exercises assist the student in finding methods for dealing comfortably and positively with real-life situations.

DRA 4130 Prizewinning Plays (3 q.h.)

What makes a play win a Pulitzer Prize or a Tony Award? To find out, students examine selected plays that have received one or more of these prizes.

DRA 4140 Introduction to Acting 1 (formerly Workshop for the Actor 1) (3 q.h.)

Physical preparation for the actor, including basic stage movement and deportment, control of the stage voice, analysis and establishment of characterization through observation and awareness of the body, and improvisations and short scenes.

DRA 4141 Introduction to Acting 2 (formerly Workshop for the Actor 2) (3 q.h.)

Psychological preparation for the actor, including analysis and establishment of characterization through memory, emotion, imagination, and recall; analysis of specific roles; the creation of a character analysis book; and improvisations and short scenes. *Prereq. DRA 4140 or instructor's permission.*

DRA 4142 Acting 3 (formerly Workshop for the Actor 3) (3 q.h.)

Preparing and performing the role, including the physical and psychological preparation of specific roles. Also includes short classroom scenes and the presentation of a one-act play. *Prereq. DRA 4141 or instructor's permission.*

DRA 4150 Introductory Mime Workshop (3 q.h.)

In-depth introduction to mime, featuring illusionary technique, silent acting, and the creation of material for mime theatre.

DRA 4151 Acting for the Camera (Studio)* (3 q.h.)

The adaptation of theatre acting techniques to the camera. In-studio experiences relative to the performer's physical and vocal persona in creating

a character, developing the role and revealing the personality. On-camera involvement in short dramatic pieces. (Laboratory fee.) *Prereq. DRA 4140 and 4141 or instructor's permission.*

DRA 4152 Acting for Commercials (Studio)* (3 q.h.)

Understanding the "art" of movement and gesture in commercials; with commercial terminology and procedures; with manipulating commercial dialogue as well as handling the "product." In-studio/on-camera practice with commercial scripts. (Laboratory fee.) *Prereq. DRA 4151 or instructor's permission.*

DRA 4153 Acting for Voice Overs (Studio)* (3 q.h.)

The use of the voice for "selling" a product or service. Understanding microphone and sound booth techniques. Developing your own "voices," analyzing commercial dialogue and speaking it effectively. (Laboratory fee.) *Prereq. DRA 4152 or instructor's permission.*

DRA 4154 Advanced Camera and Microphone Techniques (Studio)* (3 q.h.)

This course is for the experienced actor wishing to further develop on camera and voice-over skills for commercial and industrial performances. Classes are held in the TV Studio and all work is taped. Students will have their own tapes for personal evaluations. (Laboratory Fee). *Prereq. DRA 4153 or instructor's permission.*

DRA 4160 Drama Movement and Therapy (3 q.h.)

Exploration of teaching and rehabilitative methods, using the techniques of creative dramatics and dance/movement therapy. Emphasizes the exceptional child and the physically and emotionally handicapped.

DRA 4170 Creative Dramatics for Teachers (3 q.h.)

Introduction to the methods and creative techniques of using dramatics for programs in schools, churches, and recreational facilities. Teachers can learn how to use improvisation for self-improvement with students of all ages.

DRA 4200 The Comic Theatre (3 q.h.)
Comic performance, from its beginnings in ancient Greece through its use in radio and television sitcoms, movies, and by stand-up comedians. Includes an examination of comic theory, the comic writer, and the comic performer. The course centers around the basic notion that "comedy is serious business." Lectures, movie and television viewing, and attendance at live performances. Cost of theatre tickets not included in tuition.

DRA 4230 The Boston Theatre Scene (3 q.h.)
Opportunity to view and critique live

performances presented in the Boston area's major and "off-Broadway" theatres. Cost of theatre tickets not included in tuition.

DRA 4250 Theatre Movement (3 q.h.)
Deals with relaxation, concentration, and the use of the body to free the emotional self.

DRA 4260 Theatre Speech (3 q.h.)
Focuses on vocal technique and speech problems unique to actors performing in contemporary and classical theatre.

ECONOMICS

ECN 4001 Overcoming Statistics Stress (noncredit)
This seminar is designed to show students how to put aside anxieties by understanding the components of statistics and developing techniques to simplify seemingly difficult word problems. Mathematical skills needed include addition, subtraction, division, multiplication, knowledge of square roots, and basic algebra.

ECN 4115 Economic Principles and Problems 1 (3 q.h.)
Application of the basic principles of economics to current public problems. Focusing on macroeconomics, students explore unemployment, inflation, national income and employment theory, and government expenditures and taxation.

ECN 4116 Economic Principles and Problems 2 (3 q.h.)
Continuation of ECN 4115, focusing on the role of the banking system, the Federal Reserve System, and supply-side policies. Topics in microeconomics include the role of a market pricing system; supply and demand, the costs of production; profits; and the supply decision. *Prereq.* ECN 4115 or equiv.

ECN 4117 Economic Principles and Problems 3 (3 q.h.)
Continuation of ECN 4116, focusing on markets and the allocation of resources. Topics include competitive markets, monopoly, oligopoly, factor markets, and income distribution. Economic principles are applied to

selected problem areas, including poverty, pollution, energy, international trade, and the balance of payments. *Prereq.* ECN 4116 or equiv.

ECN 4118 Economics (Intensive) (9 q.h.)
Same as ECN 4115, ECN 4116, and ECN 4117.

ECN 4130 Medical Economics (3 q.h.)
Topics include health care trends in the United States; causes for increases in medical care costs; supply and training of health care personnel; the nation's need for physicians, nurses, pharmacists, and other allied health personnel; the quality of medical care; economics of health insurance plans; and consumer demand for health care, medical facilities, and professional and semiprofessional personnel.

ECN 4137 History of Economic Thought (3 q.h.)
Development of economic thought, including Mercantilism as the first economic doctrine; analysis of the older, classical school with its later refinements (Modern Marginalism) and its important critics (socialists, Marxists); and Keynesian and modern developments.

ECN 4140 Economics of Crime (3 q.h.)
Theoretical and empirical analyses of the economic causes of criminal behavior. The social costs of crime, its prevention, and techniques for designing optimum law enforcement policies.

**Courses designated "(Studio)" meet for 3½ hours.*

ECN 4150 Energy Economics (3 q.h.)
Economic, political, and historical background of energy and other resource problems, including examination of the future impact of primary resource limitations on U.S. and world economics and feasibility studies of resource substitution.

ECN 4215 Macroeconomic Theory (3 q.h.)
A discussion of conceptual and empirical problems of creating and using national accounts; price index problems; conceptual and empirical evaluation of several consumption and investment functions and their policy implications; and multiplier and accelerator models. Includes a brief history of recent cyclical fluctuations as well as an analysis of inflation and growth theories in light of recent economic history. *Prereq. ECN 4117 or equiv.*

ECN 4216 Microeconomic Theory (3 q.h.)
Topics include supply and demand analysis, elasticity concepts and applications, theory of consumer demand, theory of production, and derivation of cost curves. Also, pricing and output behavior in the several market structures, their welfare implications, and the pricing of resources. *Prereq. ECN 4117 or equiv.*

ECN 4250 Statistics 1 (3 q.h.)
Introduction to the collection and organization of data, including the measurement, presentation, and uses of elementary set theory; measures of central tendency and variability; basic probability; and probability distributions.

ECN 4251 Statistics 2 (3 q.h.)
Sampling and basic estimation techniques, "t" distribution, testing of statistical hypotheses, and analysis of variances. *Prereq. ECN 4250 or equiv.*

ECN 4252 Statistics 3 (3 q.h.)
Methods of econometric estimation and forecasting, including linear regression analysis, correlation analysis, time series analysis, and index numbers. *Prereq. ECN 4251 or equiv.*

ECN 4253 Statistics Intensive A (formerly Statistics Intensive) (9 q.h.)
Same as ECN 4250, ECN 4251, and ECN 4252.

ECN 4254 Statistics Intensive B (6 q.h.)
Same as ECN 4250 and ECN 4251.

ECN 4255 Hands-On Statistics (4 q.h.)
Statistics techniques and applications, including frequency distributions, measures of central tendency, measures of dispersion, probability and probability distributions, and sampling and estimation techniques. Class time is divided equally into lecture and laboratory; the latter focuses on individual, supervised problem-solving. *Not open to students who have taken ECN 4250.*

ECN 4310 Labor Economics (3 q.h.)
Economic analysis of the labor market, including the labor force, the demand for labor, and the institutions and policies dealing with them. Examines employment, unemployment, wage determination, and the development and efficient use of labor resources as well as collective bargaining issues and their economic consequences. *Prereq. ECN 4117 or equiv.*

ECN 4311 Human Resource Planning (3 q.h.)
Assessment of government and private efforts to fight poverty and improve the labor market position of impoverished groups. Considers the relationship between causes of poverty and discrimination and possible remedies. Also considers training programs, negative income tax, family allowances, and other income maintenance schemes.

ECN 4312 Economic Concerns of Older Adults (3 q.h.)

Designed to provide a basic knowledge of economic principles as they apply to senior members of the community. Includes how the U.S. economic policies and market system determine the price, quality, and availability of medical care and other allied services.

ECN 5312 Economic Concerns of Older Adults (3 CEUs)
Same as ECN 4312.

ECN 4313 Women in the Labor Force (3 q.h.)

Economic analysis of women's labor market position in the context of the changing economic structure and labor market institutions. Analysis of female labor force participation differences; male-female differentials in earnings and unemployment; occupational concentration, occupational segregation; theories and evidence of sex discrimination; and new opportunities for women.

ECN 4315 Income Inequality and Discrimination (3 q.h.)

Analysis of the composition of impoverished groups and recent trends. Examines the labor market, demographic and institutional forces contributing to poverty, the role of education, the economics of race and sex discrimination, the public welfare system, and proposed reforms.

ECN 4321 Urban Economic Problems and Policies (3 q.h.)

Economic analysis of selected urban problems such as housing, poverty, transportation, education, health, crime, and the urban environment. Includes discussion of public policies relating to such problems.

ECN 4322 Economics of Transportation (3 q.h.)

Transportation and land-use patterns, ownership, regulations, financing, social costs and benefits of various modes of transportation, and economies of new technology.

ECN 4323 Environmental Economics (3 q.h.)

(formerly Economics of the Quality of Urban Environment and Control)
Economic analysis of air, water, thermal, and noise pollution. The utilization of urban space and other urban resources; identification of possible economic effects of urban environment, such as crime, delinquency, immobility, and congestion.

ECN 4330 Economic Growth and Development (3 q.h.)

Prospects for economic growth and development in impoverished nations as indicated by economic analysis and historical experience. Includes the social, cultural, and institutional

determinants of growth and an analysis of agriculture and development.

ECN 4331 American Economic History (3 q.h.)

Economic development of the United States, with emphasis on the post-Civil War period and the effect of certain European developments.

ECN 4333 European Economic Development (3 q.h.)

Historical survey of European economic development from overseas expansion to the dissolution of empires and the Common Market. Examines the environmental impact of industrialism and the implications of living in a technological society.

ECN 4334 Comparative Economic Systems (3 q.h.)

Competing types of theoretical economic systems; analysis of the organization and operation of currently existing types of communist, socialist, and capitalist economies; and comparison and evaluation of the economic behavior and performance of different economic systems.

ECN 4335 International Trade (3 q.h.)

(formerly International Economics 1)
Economics of international trade, including tariffs, use of resources, and balance-of-payment mechanisms.
Prereq. ECN 4117 or *equiv.*

ECN 4336 International Monetary Economics (3 q.h.)

(formerly International Economics 2)
International commercial policy, financial organizations, and recent problems. *Prereq.* ECN 4335 or *equiv.*

ECN 4341 Money and Banking Intensive (6 q.h.)

Same as ECN 4342 and 4343. *Prereq.* ECN 4117 or *equiv.*

ECN 4342 Money and Banking 1 (3 q.h.)

Introduction to money and credit, commercial banking structure, and money creation as well as the problems and policies of centralized banking in the United States. *Prereq.* ECN 4117 or *equiv.*

ECN 4343 Money and Banking 2 (3 q.h.)

Topics include theory of money, prices, and monetary policy; interest theory; debt management; and international

monetary problems and analysis.

Prereq. ECN 4342 or equiv.

ECN 4344 Government Finance (3 q.h.)

Topics include fiscal functions, institutions, and politics; growth of the public sector; expenditure planning in theory and practice; cost-benefit analysis; principles of taxation and tax incidence; major taxes at federal, state, and local levels; fiscal policy for high employment, price stability, and growth; and current fiscal problems, such as tax reform, urban fiscal problems, fiscal federalism, and income maintenance programs. *Prereq. ECN 4117 or equiv.*

ECN 4345 Business Cycles 1 (3 q.h.)

Intermediate macroeconomic theory, including theory of cyclical fluctuations in the context of multiplier and accelerator models. *Prereq. ECN 4117 or equiv.*

ECN 4346 Business Cycles 2 (3 q.h.)

Business cycle analysis, measurement, forecasting methods, and public policy. *Prereq. ECN 4345 or equiv.*

ECN 4349 Business Cycles Intensive (6 q.h.)

Same as ECN 4345 and ECN 4346.

Prereq. ECN 4117 or equiv.

ECN 4350 Introduction to Econometrics (3 q.h.)

Methods of econometric estimation and forecasting, including various statistical techniques. Students are given the opportunity to construct their own models and use computer facilities for estimation and forecasting. *Prereq. ECN 4117 and ECN 4252.*

ECN 4351 Problems in Economic Research

(3 q.h.)

Research methods used by practicing economists. Topics include typical problems from areas of applied economics, such as choices of modeling framework, development of static and dynamic adaptive policy models, problems of data collection, review of estimation techniques, and interpretation of results. *Prereq. ECN 4117 and ECN 4252.*

ECN 4353 Introduction to Mathematical Economics (3 q.h.)

Introduction to mathematical analysis, with an in-depth study of theory of

distribution. *Prereq. ECN 4117 or equiv.*

ECN 4360 Managerial Economics (3 q.h.)

Theory of demand, price, and output as applied to business firms and capital budgeting. *Prereq. ECN 4117 or equiv.*

ECN 4362 Industrial Organization and Public Policy (3 q.h.)

Theoretical framework for analysis and evaluation of the static and dynamic performance of real markets. Examines empirical studies that test the usefulness of applying theory to real markets and the existence of antitrust laws as a public policy designed to promote better market performance. *Prereq. ECN 4117 or equiv.*

ECN 4363 Government and Business 1

(3 q.h.)

The rationale for government involvement in markets, the role of government in national economic affairs, and the relationship between government and business, including the application of antitrust laws to business.

ECN 4364 Government and Business 2

(3 q.h.)

The government's role in economic activities. The relationships between the government and industry, labor, agriculture, public utilities, and consumers. The changing role of government from laissez-faire policy to direct intervention in the economy. Wage and price controls, environment and anti-pollution policies, consumer protection, conglomerate mergers, and regulation of industries.

ECN 4384 The Economics of the Stock Market (3 q.h.)

Topics include the organization of the stock exchange, the highly speculative nature of the stock exchanges, the functions of the exchanges, capital gains, equity, dividends, stock options, splits, puts and calls, the crash of 1929, the crash of 1987, the Great Depression, controls on the stock market, and the Federal Reserve Board.

ECN 4492 Economic Policy Seminar (3 q.h.)

Most advanced course for senior economic majors, with emphasis on independent study and contemporary issues. *Prereq. ECN 4117 or equiv.*

ECN 4495 Honors Program 1 (4 q.h.)
Opportunity to undertake an in-depth research study project. See page 21 for details. *Prereq.* 96 q.h., 3.5 q.p.a.

ECN 4496 Honors Program 2 (4 q.h.)
See ECN 4495.

ECN 4497 Honors Program 3 (4 q.h.)
See ECN 4495.

ECN 4500 Advanced Tutorial 1 (3 q.h.)
Opportunity to take an upper-level course independently. See page 21 for details. *Prerequisite* 87 q.h.

ECN 4501 Advanced Tutorial 2 (3 q.h.)
See ECN 4500.

ECN 4510 Independent Study 1 (3 q.h.)
Opportunity to undertake special

research. See page 21 for details.
Prereq. 96 q.h., 3.0 q.p.a.

ECN 4511 Independent Study 2 (3 q.h.)
See ECN 4510.

ECN 4512 Independent Study 3 (3 q.h.)
See ECN 4510.

ECN 4601 Economics 1 (4 q.h.)
Development of macroeconomic analysis, review of national income concepts, national income determination fluctuation and growth, the role of the banking system and the Federal Reserve system, government expenditures and taxation, international trade, and balance of international payments. *For Alternative Freshman-Year students only.*

usage). Focuses on study skills, previewing, finding main ideas and details, outlining and summarizing, continuous interaction, and interaction of all the communications skills—reading, writing, listening, and speaking. *For Alternative Freshman-Year students only.*

ED 4004 Integrated Language Skills B (4 q.h.)

Extends ED 4003, with continued emphasis on study skills, including researching, organizing, and writing term papers. Explores critical thinking as it relates to the learning process. Also addresses the choices of academic major and career direction, emphasizing self-assessment and personal decision making. *For Alternative Freshman-Year students only. Prereq.* ED 4003.

ED 4050 College Reading and Study Skills (3 q.h.)

Reading comprehension, text and lecture note-taking skills, and examination-taking skills. Students practice with excerpts from texts and taped lectures, and apply the skills to materials in other courses. Intended for students who are beginning college work and wish to develop reading and study skills. (Not for students who have already taken the Basic Day College courses Reading/Study Skills 1 or Integrated Language Skills Development 1.)

EDUCATIONAL SKILLS

ED 4001 Integrated Language Skills Development 1 (2 q.h.)

Strives to improve a student's reading comprehension and related study and language skills. Devotes time, discussion, and considerable practice to meaning skills such as basic reading comprehension and interpretation, including work in critical reading and other interpretational acts (inferences, understanding imagery, and symbolic usage). Focuses on study skills, reviewing, finding main ideas and details, outlining and summarizing, continuous interaction, and interaction of all the communications skills—reading, writing, listening, and speaking. *For Alternative Freshman-Year students only.*

ED 4002 Integrated Language Skills Development 2 (2 q.h.)

Continues discussion of topics introduced in ED 4001. *For Alternative Freshman-Year students only. Prereq.* ED 4001.

ED 4003 Integrated Language Skills A (4 q.h.)

Strives to improve a student's reading comprehension and related study and language skills. Devotes time, discussion, and considerable practice to meaning skills such as basic reading comprehension and interpretation, including work in critical reading and other interpretational acts (inferences, understanding imagery, and symbolic

EMERGENCY MEDICAL SERVICES

EMS 4107 EMT-Basic (9 q.h.)

The course covers evaluation and management of the following medical emergencies; cardiopulmonary arrest, severe bleeding and shock; fractured bones; care for heart attack, stroke, burn and poisoning victims; extrication and removal of victims from crashed vehicles and collapsed buildings; emergency childbirth and various other medical emotional and environmental emergencies.

EMT-Basic includes: 6 hours of class weekly for 12 weeks. Two (2) all day Saturday exercises (combination of indoor and outdoor) that include practical demonstration of ambulance and/or emergency vehicles and techniques. Ten (10) hours of in-hospital emergency room observation.

EMT Basic Skills: CPR (cardiopulmonary resuscitation), obstructed airway maneuvers, control of bleeding, taking vital signs (pulse/respiration/blood pressure), patient assessment, bandaging and splinting, emergency carries and lifting and moving devices (ambulance and orthopedic stretchers, etc.), triage at multi-victim accident.

EMS 4117 Emergency Medical Services 1 (4 cl., 6 lab., 6 q.h.)

Introduction to the Paramedic Program: role and responsibilities of Paramedics, medical terminology, human systems, patient assessment, blood, fluids and electrolytes, shock and shock management. The laboratory component provides the opportunity to correlate didactic knowledge while developing psychomotor skills. *To receive credit for this course, you must also register for BIO 4178.*

EMS 4118 Emergency Medical Services 2 (4 cl., 6 lab., 6 q.h.)

Continuation of Paramedic Program: respiratory system, cardiovascular system, pathophysiology and emergency management, electrocardiograms, life-threatening dysrhythmias. The laboratory component provides the

opportunity to correlate didactic knowledge while developing psychomotor skills. *Prereq. EMS 4117 or equiv.*

EMS 4119 Emergency Medical Services 3 (4 cl., 6 lab., 6 q.h.)

Continuation of Paramedic Program: central nervous system, soft tissue injuries, musculoskeletal system, medical emergencies, acute abdomen, genitourinary system, geriatric emergencies. The laboratory component provides the opportunity to correlate didactic knowledge while developing psychomotor skills. *To receive credit for this course, you must also register for BIO 4179. Prereq. EMS 4118 or equiv.*

EMS 4120 Emergency Medical Services 4 (4 cl., 6 lab., 6 q.h.)

Continuation of Paramedic Program: obstetric/gynecologic emergencies, including emergency childbirth, neonatal and pediatric patients, emotionally disturbed patient, stress management, gaining access and extrication, multiple casualty incidents, emergency communications. The laboratory component provides the opportunity to correlate didactic knowledge while developing psychomotor skills. *Prereq. EMS 4119 or equiv.*

EMS 4121 Emergency Medical Services 5 (27.5 lab., 11 q.h.)

Clinical Practicum I of the Paramedic Program: application of theoretical knowledge and psychomotor skills in hospital unit rotations. *Prereq. EMS 4120 or equiv.*

EMS 4122 Emergency Medical Services 6 (27.5 lab., 11 q.h.)

Clinical Practicum II of the Paramedic Program. *Prereq. EMS 4121 or equiv.*

EMS 4123 Emergency Medical Services 7 (100 lab., 3 q.h.)

Field internship component of the Paramedic Program: opportunity to practice and develop all necessary psychomotor skills on an urban advanced life support system. *Prereq. EMS 4122 or equiv.*

ENGLISH

ENG 4005 Introduction to English as a Second Language (noncredit)

Introduction to the grammar and rhetoric of English as a second language. Practice in listening, speaking, and writing, with selected readings and exercises for improving vocabulary and pronunciation.

ENG 4006 Intermediate English as a Second Language (noncredit)

Intermediate course in English as a second language. Practice in preparing written and oral reports, including business and social letters. *Prereq.* *ENG 4005 or equiv.*

ENG 4007 Advanced English for International Students (3 q.h.)

Advanced course in English as a second language. Practice in special forms of writing to improve clarity, syntax, and organization. *Prereq.* *ENG 4006 or instructor's permission.*

ENG 4011 Elements of Writing (3 q.h.)

Review of the structural patterns of current English. Practice in writing sentences, paragraphs, and short papers.

ENG 4012 Elements of Grammar (3 q.h.)

A study of grammar and the way the English language works. Helps students understand the parts of speech, the mechanics of punctuation, and the vagaries of spelling. Exercises in solving problems of number, case, tense, degree, and usage.

ENG 4013 Fundamentals of English 1 (4 q.h.)

Intensive introduction to the principles of effective expository writing, emphasizing description, paragraph construction, and organization. Includes a review of the conventions of English usage, punctuation, and syntax. Essay assignments. *For Alternative Freshman-Year students only.*

ENG 4014 Fundamentals of English 2 (4 q.h.)

Intensive instruction in exposition, argument, and academic essay and research paper writing, in addition to continued study of the conventions of English usage, punctuation, and syntax. Essay assignments. *For Alternative Freshman-Year students only.* *Prereq.* *ENG 4013 or equiv.*

ENG 4110 Critical Writing 1 (3 q.h.)

Detailed examination of the principles and methods of rhetoric, especially narration, description, and exposition. Includes frequent practice in writing paragraphs and themes in those modes. *A writing proficiency test is given at the first class meeting.*

ENG 4111 Critical Writing 2 (3 q.h.)

Continued examination of the principles and methods of rhetoric, especially persuasion and argument, the study of short fiction, and the development of research skills. Includes practice in writing persuasive and critical themes and in preparing research papers. *Prereq.* *ENG 4110 or equiv.*

ENG 4112 Approaches to Literature (3 q.h.)

Further refinement of writing and analytical skills through the study of drama and poetry. Practice in writing longer critical papers. *Prereq.* *ENG 4111 or equiv.*

ENG 4120 English Literature: Faith and Humanism (3 q.h.)

English literature from its beginnings to 1700, including works by Chaucer, Spenser, Shakespeare, Donne, and Milton.

ENG 4121 English Literature: Reason and Romanticism (3 q.h.)

English literature from the Neoclassical period to the Romantic age, including works by Pope, Swift, Johnson, Blake, Wordsworth, and Keats.

ENG 4122 English Literature: Victorians and Moderns (3 q.h.)

English literature from the Victorian Age through the twentieth century, including works by Browning, Arnold, Hardy, Yeats, and Eliot.

ENG 4123 Early American Literature: Faith, Reason, and Nature (3 q.h.)

American literature from its beginnings through the nineteenth-century Transcendentalists, including works by Bradstreet, Taylor, Edwards, Franklin, Emerson, and Thoreau.

ENG 4124 American Romantics and American Realists (3 q.h.)

The fiction and poetry of nineteenth-century America, including works by

Hawthorne, Melville, Whitman, Dickinson, Twain, James, Crane, and Dreiser.

ENG 4125 American Literature: The Modern Temper (3 q.h.)

The prose and poetry of twentieth-century America, including works by Eliot, Stevens, Fitzgerald, Hemingway, Wright, and Plath.

ENG 4131 God, Gods, and Heroes: The Literature of the Ancient and Medieval Worlds (3 q.h.)

Literary traditions of the ancient world and the Middle Ages in the work of such writers as Homer, Aeschylus, Sophocles, Euripides, Aristophanes, Virgil, and Dante, as well as in the art of biblical narrative.

ENG 4132 Man, Reason, and Imagination: Literature from the Renaissance to the Romantic Age (3 q.h.)

Literary traditions of the Renaissance, Neoclassicism, and Romanticism in the work of such writers as Machiavelli, Moliere, Racine, Voltaire, and Goethe.

ENG 4133 Order and Disorder: Literature of the Moderns (3 q.h.)

Literary traditions of Realism and Modernism in the work of such writers as Dostoevsky, Ibsen, Mann, Kafka, and Sartre.

ENG 4210 Science Fiction (3 q.h.)

Myths and rhetorical strategies of science fiction, including such novels as *Frankenstein*, *Childhood's End*, and *Stranger in a Strange Land*.

ENG 4211 Fantasy Literature (3 q.h.)

Exploration of fantasy literature of the nineteenth and twentieth centuries and its roots in myth, fairy-tales, and popular legends. Focuses on the works of such authors as T.H. White, Lewis Carroll, Lord Dunsany, Kenneth Grahame, Richard Adams, J.R.R. Tolkien, Ursula Le Guin, and Patricia McKillin.

ENG 4212 Horror Fiction (3 q.h.)

Horror literatures and its concerns with the supernatural, the irrational, the nature of evil, and the landscape of dreams, including such novels as *Dracula*, *Dr. Jekyll and Mr. Hyde*, and *The Turn of The Screw*.

ENG 4213 Detective Fiction (3 q.h.)

Elements of intrigue, logic, and thought converge in this study of the whodunit. Students sample a wide range of detective fiction to explore the questions of innocence and guilt, action and responsibility, power and authority, and victim and victimizer, and to see connections between this popular form of literature and its classical antecedents.

ENG 4214 The Psychological Novel (3 q.h.)

A study of the mental and emotional processes affecting the form and style of such works as *Crime and Punishment*, *The Metamorphosis*, and *The Stranger*.

ENG 4220 Children's Literature (3 q.h.)

The psychology of creation, the ways of the imagination, and the role of fantasy and play in such children's books as *Alice in Wonderland*, *The Wizard of Oz*, and *Charlotte's Web*.

ENG 4221 Images of Women in Literature (3 q.h.)

Images of women and their underlying archetypes in imaginative literature. Includes such writers as Homer, Austen, Ibsen, and Lawrence.

ENG 4222 American Women Writers (3 q.h.)

Representative nineteenth- and twentieth-century American women writers, including such poets as Dickinson and Plath and such novelists as Chopin and Cather.

ENG 4223 British Women Writers (3 q.h.)

Important historical and thematic connections in the work of British women writers of the last two hundred years, including the novels of Austen, Eliot, Woolf, and Lessing.

ENG 4230 Modern Irish Literature (3 q.h.)

Irish literature in English from 1885 to the present, including such writers as Yeats, Joyce, O'Casey, and Behan.

ENG 4231 Irish Writers in America (3 q.h.)

Irish themes and attitudes in the fiction and drama of twentieth-century America, including such writers as O'Neill, Donleavy, Alfred, and McHale.

ENG 4232 Ethnic Literature in America (3 q.h.)

The range, variety, and themes of ethnic literature in America in the work of such writers as Philip Roth, Toni Morrison, Maxine Hong Kingston, and F. Scott Momaday.

ENG 4233 Outside the Mainstream: The Literature of America's Subcultures (3 q.h.)

Literature that reflects the specific interests, values, and concerns of America's diverse subcultural populations, including such works as *Black Elk Speaks*, *City of Night*, *Woman Warrior*, and the stories of Isaac Bashevis Singer.

ENG 4234 Modern American Voices: The New Essayists (3 q.h.)

Major nonfiction of the 1960s, 1970s, and 1980s, stressing the fresh styles and often disturbing cultural perspectives of such works as Mailer's *The Armies of the Night*, Pirsig's *Zen and the Art of Motorcycle Maintenance*, Dillard's *Pilgrim at Tinker Creek*, and Brautigan's *Trout Fishing in America* as well as the "new journalism" of such writers as Joan Didion, Tom Wolfe, Susan Sontag, and Woody Allen.

ENG 4235 The American Dream (3 q.h.)

Literature about money: stories of wealth and poverty, success and failure. Is the American Dream true or a myth? Books include Benjamin Franklin's *Autobiography*, Edith Wharton's *House of Mirth*, and Upton Sinclair's *The Jungle*.

ENG 4240 Fiction and the Movies (3 q.h.)

Reading and seeing: an examination of the success (and failure) of turning famous novels and stories into movies. Original works, such as *The Great Gatsby*, *Lolita*, *One Flew Over the Cuckoo's Nest*, and *Looking for Mr. Goodbar*, compared to film versions. Includes elementary film theory and criticism.

ENG 4241 Topics in Film (3 q.h.)

Examination of a theme or problem in film, a period in film history, a film genre, or the work of a particular director in order to assess technique and meaning. Topics change from quarter to quarter—for example, film and society, American films of the forties, the

western, Hitchcock—so that students may take this course more than once.

ENG 4250 Biography and Nonfiction (3 q.h.)

Study of biography in an attempt to understand how individual behavior and achievement relate to social, cultural, political, and artistic values.

ENG 4260 The Literature of Adolescence (3 q.h.)

Adolescence as depicted in works drawn from different cultures and times. Examines popular versus literary views of adolescence, focusing on such themes as the struggle for self-definition, the role of peers, and the effects of gender and class.

ENG 4261 The Literature of Old Age (3 q.h.)

Old age as depicted in works drawn from different cultures and times. Examines popular versus literary views of old age, focusing on such themes as old age as a period of psychological reassessment; the role of family, class, and gender; and the emotional implications of confronting death.

ENG 4349 Expository and Persuasive Writing 1 (3 q.h.)

Designed to help students develop confidence and proficiency in writing. Through first drafts to revisions, weekly writing assignments concentrate on mastering the skills of subject focus, clarity of expression, controlled development, and organization. *Prereq.* ENG 4110 or equiv.

ENG 4350 Expository and Persuasive Writing 2 (3 q.h.)

Development of precise and persuasive writing patterns through experiments with various rhetorical strategies. Students are expected to write extensively on topics of current interest to gain fluency and to learn how to target their writing toward different audiences. Assignments also provide practice in persuasive writing and in using different writing models to gain control of the material. *Prereq.* ENG 4349 or equiv.

ENG 4352 Expository Communications (3 q.h.)

Workshop in expository prose, emphasizing the practical problems of the writer on the job in advertising, public

relations, or publishing. Includes practice in designing and writing special projects. *Prereq.* ENG 4349 or equiv.

ENG 4356 Creative Writing (3 q.h.)

An opportunity to write and develop a variety of forms, including experiments in journals and short stories, plays and poems. Features in-class discussion of students' work and a final project of choice.

ENG 4357 Creative Writing: Poetry (3 q.h.)

Practice in writing different forms of poetry for beginning poets. Includes discussion and criticism of student work and selected texts.

ENG 4358 Creative Writing: Fiction (3 q.h.)

Practice in writing various types of short stories for beginning writers of short fiction. Includes discussion and criticism of student work and selected texts.

ENG 4359 Creative Writing Workshop (3 q.h.)

Discussion and criticism of student manuscripts for practicing writers.

ENG 4363 Writing for the Marketplace (3 q.h.)

Workshop for writers venturing into the marketplace, designed to provide a working knowledge of the publishing industry and useful practice in preparing and editing manuscripts for publication. Includes the development of effective strategies for composing query letters, synopses, outlines, and sample manuscripts.

ENG 4380 Business Writing and Reports 1 (3 q.h.)

Introduction to the vocabulary and philosophy of business communications. Practice in planning, writing, and analyzing effective business letters and memoranda. *A writing proficiency test is given at the first class meeting.*

ENG 4381 Business Writing and Reports 2 (3 q.h.)

Methods and principles of research and documentation of semitechnical analyses and business reports. Practice in organizing and writing complex forms of business communications. *Prereq.* ENG 4380 or equiv. *No prereq. for Liberal Studies or Technical Communications degree candidates.*

ENG 4383 Business Writing and Reports (Intensive) (6 q.h.)

Same as ENG 4380 and ENG 4381. *A writing proficiency test is given at the first class meeting.*

ENG 4500 The English Language (3 q.h.)

Development of modern English from its pre-Anglo-Saxon beginnings. Effects of Roman, Scandinavian, and Norman invasions; dialect geography; evolutionary change; and word formation and borrowing.

ENG 4501 Linguistics (3 q.h.)

Theories of the nature and origin of language, review of historical and comparative linguistics, prescriptive and descriptive grammars, and structural and generative-transformational phonology, morphology, and syntax.

ENG 4502 Semantics (3 q.h.)

The relation between language and behavior, levels of abstraction in communication, habits of evaluation of linguistic phenomena, and the modification of such habits for human understanding and survival.

ENG 4600 Topics in Literature (3 q.h.)

Examination of a variety of subjects and themes, such as the relationship between literature and the arts; the censored novel; alienation; and the Holocaust. Because the topics change from quarter to quarter, students may take this course more than once, provided they focus on a different topic each time.

ENG 4604 Major Figure in Literature (3 q.h.)

Examines in detail and depth the work of a major writer of poetry, fiction, or drama, such as Walt Whitman, Leo Tolstoy, Virginia Woolf, or Samuel Beckett. Students may take this course more than once, provided they focus on a different figure each time.

ENG 4610 The American Short Story (3 q.h.)

Development of the American short story from its nineteenth-century origins to its present forms. Includes such writers as Poe, Hawthorne, James, Hemingway, Roth, and Updike.

ENG 4611 The American Novel (3 q.h.)

Development of the novel in America and its characteristic qualities. Includes

such writers as Cooper, Melville, James, Wharton, Faulkner, and Ellison.

ENG 4612 Contemporary American Poetry (3 q.h.)

Structure and themes of poetry in post-1945 America. Includes such writers as Ginsberg, Plath, Snodgrass, and Wilbur.

ENG 4640 The Twentieth Century (3 q.h.)

The prose and poetry of such twentieth-century writers as Yeats, Eliot, Joyce, Lawrence, Woolf, Thomas, and Lessing.

ENG 4641 Contemporary English Poetry (3 q.h.)

Structure and themes of poetry in post-1945 England. Includes the work of Gunn, Hughes, and Larkin.

ENG 4642 The English Novel (3 q.h.)

Development of the English novel from its beginnings in the eighteenth century through its concern with manners and morals in the nineteenth century to the experimentation of the twentieth century. Includes such writers as Fielding, Richardson, Austen, Dickens, Eliot, and Woolf.

ENG 4649 European and English Short Story (3 q.h.)

Development of the short story in Europe and England in both the nineteenth and twentieth centuries. Includes such writers as de Maupassant, Balzac, Mann, Camus, Kipling, Lawrence, Greene, and Boll.

ENG 4650 Modern Bestsellers (3 q.h.)

The fascinating world of modern bestsellers, a world of romance and adventure, of high living and sinister intrigue, by such popular writers as Rona Jaffe, Harold Robbins, Jacqueline Susann, and Irving Wallace.

ENG 4651 The Continental Novel (3 q.h.)

Development of the European novel through its various forms and themes, from Balzac and Tolstoy to Proust and Mann.

ENG 4652 Russian Masterworks (3 q.h.)

The work of such Russian masters of the novel and the short story as Pushkin, Turgenev, Dostoyevsky, and Tolstoy in the nineteenth century and Zamyatin, Pasternak, Babel, and Solzhenitsyn in the twentieth.

ENG 4653 Latin American Fiction (3 q.h.)

The variety of Latin American fiction of the past generation of writers, such as Marquez and Puig, Borges and Cortázar, Bombal and Lispector.

ENG 4655 Contemporary Fiction (3 q.h.)

The range and variety of such post-1945 fiction writers as Bellow, Updike, Lessing, Gordimer, Baldwin, and Roth.

ENG 4658 Shakespeare the Dramatist (3 q.h.)

Detailed examination of representative plays from Shakespeare's early, middle, and late periods in order to illustrate his development as a dramatist and define his principal themes in such plays as *A Midsummer Night's Dream*, *Romeo and Juliet*, and *King Lear*.

ENG 4659 Shakespeare: The Major Tragedies and Comedies (3 q.h.)

Study of examples of Shakespeare's mature dramatic art, such as *As You Like It*, *Much Ado About Nothing*, *Hamlet*, *Macbeth*, and *Antony and Cleopatra*.

ENG 4662 The Bible as Literature (3 q.h.)

Studies selected books of both the Old Testament and New Testament as literature in an historical and cultural context.

ENG 4802 Honors Program 1 (4 q.h.)

Opportunity to undertake an in-depth research study project. See page 21 for details. *Prereq.* 96 q.h., 3.5 q.p.a.

ENG 4803 Honors Program 2 (4 q.h.)

See ENG 4802.

ENG 4804 Honors Program 3 (4 q.h.)

See ENG 4802.

ENG 4815 Advanced Tutorial 1 (3 q.h.)

Opportunity to take an upper-level course independently. See page 21 for details. *Prerequisite* 87 q.h.

ENG 4816 Advanced Tutorial 2 (3 q.h.)

See ENG 4815.

ENG 4820 Independent Study 1 (3 q.h.)

Opportunity to undertake special research. See page 21 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

ENG 4821 Independent Study 2 (3 q.h.)

See ENG 4820.

ENG 4822 Independent Study 3 (3 q.h.) See ENG 4820.

EARTH SCIENCES

ESC 4103 Introduction to the Earth Sciences: The Solid Earth (3 q.h.)

A general introduction to the processes that affect the earth's surface and interior. Topics include: the effects of rivers and glaciers on the earth's surface; the influence of wind, waves, currents and storms on coasts; and the origin of volcanoes, mountain belts, and earthquakes.

ESC 4104 Introduction to the Earth Sciences: Earth's Oceans and Atmosphere (3 q.h.)

This course is a general introduction to the earth's oceans and atmosphere. The course explores how the sea is affected by: the rotation of the earth; by sunlight; by the gravity of the moon and sun; by glaciers and rivers; and by the surrounding continents. The earth's weather systems are influenced by many of the same factors, and the course uses this background to explain the broad patterns of winds and storms on our planet.

ESC 4105 Introduction to the Earth Sciences: Earth and the Planets (3 q.h.)

This course considers current ideas on the development of the solar system. It describes how the earth and moon evolved as planetary bodies, and contrasts their development with that of the other planets and moons in terms of size, distance from the sun, and bulk composition. Many observations are used to describe current thoughts about how the solar system has developed, including: telescope studies of the sun, moon and planets; studies of rock samples returned from the moon and of meteorites found on the earth; and data obtained by planetary lander and fly-by missions.

ESC 4109 Introduction to the Earth Sciences (Intensive) (9 q.h.)

Same as ESC 4103, ESC 4104, and ESC 4105.

ESC 4203 Gemology (3 q.h.)

Topics include aspects of crystallography and physical properties of minerals relevant to gemstones; gem cutting methods; origin of color in minerals; behavior of light in minerals and its influence on gem cutting; types of inclusions found in gemstones and their effects on optical properties (star sap-

phire, cat's eye); techniques of growing crystals; geology and geography of selected gem deposits; properties of the major types of gemstones and imitations.

ESC 4204 Physical Geology (3 q.h.)

This course covers the same range of material as ESC 4103, but in more detail and at a faster pace. The course focuses on a discussion of the plate tectonic processes believed to underlie the evolution of the continents, oceanic islands, and the ocean basins, in order to explain the generation of earthquakes, volcanoes and mountain belts. One effect of moving continents and ocean basins sideways is to create high mountain ranges. Once the rock has been uplifted by plate tectonic events, the course examines the weathering and erosional processes which wear the mountains down.

ESC 4205 Historical Geology (3 q.h.)

A comprehensive study of the rock and fossil evidence which establishes how the earth and the life on it has evolved over geologic time. Special attention is paid to the evolution of plants and animals and to the ways in which fossils can be used as a basis for understanding the history of the earth.

ESC 4210 Physical Oceanography (3 q.h.)

Origin of the global ocean, the physical and chemical properties of sea water, the development of ocean currents and their effects on land masses of the world, and the problems of ocean pollution.

ESC 4211 Biological Oceanography (3 q.h.)

Study of habitat zones and organisms of the sea and the economic importance of renewable marine resources for an expanding world population.

ESC 4212 Geological Oceanography (3 q.h.)

This course examines the geology of the seafloor. Continental shelves, abyssal plains, volcanic ocean ridges, and deep-sea trenches are explained using the plate tectonics model of the earth. Observations from submersibles, rock and sediment samples from the seafloor, and geophysical methods are used to explain the processes that form the mountains and valleys and the rock types that characterize the seafloor.

ESC 4213 Marine Resources (3 q.h.)

This course considers the ways in which the sea is used as a source of food, energy, transportation, and recreation. The importance of mariculture, conservation, and effects of pollution on fish and shellfish stocks are discussed. Energy sources derived from the sea include tidal power, temperature differences between warm surface water and cold deep water, and offshore deposits of gas and oil. The course concludes with a discussion of the conflicts inherent in the diverse ways in which the seas are used for recreation, transportation, fishing, and the extraction of energy resources.

ESC 4218 Groundwater (3 q.h.)

The course discusses the geologic nature of different types of aquifers in New England and other parts of the world, and examines the principles of groundwater flow in permeable rock and soil. Students must be able to work with differential equations in calculus-based problem sets.

ESC 4219 Geochemistry of Groundwater (3 q.h.)

The course describes how the composition of uncontaminated groundwater is affected by the chemistry of precipitation and by reactions with the organic and inorganic components of soil and rock. The course next considers the geochemical aspects of a number of specific groundwater contamination problems including: leachate plumes from landfills; improper disposal of hazardous wastes, leaking underground storage tanks; saltwater intrusion of coastal aquifers; etc. Students should be able to work with differential equations (groundwater flow equations) and should have taken at least one chemistry course.

ESC 4233 The Earth's Atmosphere (3 q.h.)

An introduction to the science of meteorology, in more detail than the treatment in ESC 4104. This course describes how the sun's heat, the earth's gravity, and the earth's rotation combine to cause the large-scale patterns of winds on our planet. After describing why winds generally move east-to-west in some latitudes and west-to-east in others, the formation

and motion of smaller air masses and weather fronts is considered, a topic continued in greater depth in ESC 4234.

ESC 4234 Storms (3 q.h.)

This course is focused on understanding how different types of storms develop and why they occur when and where they do. Topics include: thunderstorms, tornadoes; formation of rain, hail, and snow; wind; lightning; hurricanes and cyclones. *Prereq.* ESC 4233 suggested.

ESC 4235 Weather Forecasting and Climate Change (3 q.h.)

This course begins by discussing the kinds of data that meteorologists use to make short-term weather forecasts; how the data are obtained and summarized on weather maps; and how the maps and computers assist in forecasting the weather. The second part of the course steps backward in time to examine the causes of the earth's long-term climate fluctuations, on a scale of tens of thousands of years, using the Milankovic hypothesis (changes in the earth's orbit, etc.). Implications of the Milankovic model, plus possible warming due to the Greenhouse Effect, are used to discuss possible future changes in the earth's climate. (ESC 4233 useful but not required.)

ESC 4239 Observational Astronomy (3 q.h.)

Introduction to the planets, stars, and constellations visible to the naked eye through lectures, visits to the planetarium (Boston campus only), and outside viewing sessions. Emphasizes stars and constellations easily seen from mid-northern latitudes.

ESC 4240 Historical Astronomy (3 q.h.)

This course traces the development of ideas about the nature of the universe. It begins with the legends and predictive abilities of early civilizations. The development of telescopes caused radical changes in the interpretation of the universe; improvements since the Renaissance permit us to look deeper into space (and farther back in time). In this century, fresh input from particle physics has explained ongoing processes in stars, and leads to consideration of the earliest stages in the development of the universe.

ESC 4243 Stars (3 q.h.)

This course traces the events that occur throughout the lifetimes of different kinds of stars. Topics include: the sun as a model star; the differences that are observed in mass, temperature, and types of energy emitted among different types of stars; formation of stars; creation of chemical elements within stars and dispersal of these elements into surrounding space during supernovas; and processes that stars undergo in their juvenile stage, through middle age, to death. *Prereq. ESC 4239 recommended.*

ESC 4244 Cosmology (3 q.h.)

Cosmology is the study of the universe as a whole. This course expands upon topics introduced in ESC 4243. Topics discussed in this course include: the structure of galaxies (Milky Way, Andromeda, etc.); the nature of interstellar and intergalactic space; and quasars, pulsars, and black holes. The major focus of this course is to enable students to appreciate the data and arguments involved in choosing between different explanations that have been proposed for the behavior of the universe. *Prereq. ESC 4243 recommended.*

ESC 4250 Conservation and the Nation (3 q.h.)

Study of conservation problems and land-use practices in the U.S. Includes an in-depth study of the irrelevance of national boundaries to conservation issues.

ESC 4251 Conservation and the Community (3 q.h.)

Study of conservation problems and land-use practices at the local level. Includes an in-depth study of urban

development and its impact on the environment. *ESC 4250 recommended.*

ESC 4252 Conservation Management (3 q.h.)

Examination of current conservation practices at the local level. Includes the role of relevant agencies, sources of knowledge and assistance, the nature and scope of needed practices, and the feasibility of community action. *ESC 4251 recommended.*

ESC 4680 Science, Technology, and Ancient Societies (3 q.h.)

Interdisciplinary course conducted using an independent study/seminar approach. An examination of changes in sciences, technologies, and societal structures from prehistory through classical cultures and the beginning of the Renaissance.

ESC 4681 Science, Technology, and Modern Societies (3 q.h.)

Interdisciplinary course conducted using an independent study/seminar approach. An examination of changes in sciences, technologies, and societal structures from the beginning of the Renaissance through the period of industrialization and the present day.

ESC 4682 Science, Technology, and Society (Intensive) (6 q.h.)

Same as ESC 4680 and ESC 4681.

ESC 4700 Advanced Tutorial 1 (3 q.h.)

Opportunity to take upper-level course independently. See page 21 for details. *Prereq. 87 q.h.*

ESC 4701 Advanced Tutorial 2 (3 q.h.)

See ESC 4700.

ESC 4801 Independent Study 1 (3 q.h.)

Opportunity to undertake special research. See page 21 for details. *Prereq. 96 q.h., 3.0 q.pa.*

FI 4301 Principles of Finance (Open) (3 q.h.)

The scope and nature of finance, introducing basic financial concepts and principles. Includes financial analysis, financial planning, working capital management, the time value of money, and an introduction to financial markets and different types of securities. *Prereq. ACC 4102 and ECN 4116.*

FINANCE**FI 4101 Personal Finance (3 q.h.)**

A practical approach to problems involved in managing personal finances. Includes financial planning, budgeting, obtaining credit and loans, income taxes, savings and investments, life insurance, home buying, and estate planning. Subjects are treated in a nontechnical manner. Recommended for nonfinance majors.

FI 4302 Financial Management (Open)

(3 q.h.)

Introduction to financial management from both a domestic and an international perspective. Includes valuation, leverage, financial analysis and planning, working capital management, capital budgeting, cost of capital, and long-term and short-term financing decisions. Spreadsheets used. *Prereq.* FI 4301 or FI 4401 and MIS 4101.

FI 4310 Investment Principles (Open)

(3 q.h.)

Investment concepts, practices, and procedures. Reviews various types of investments, including the role of security markets and security analysis. *Prereq.* FI 4301 or FI 4401.

FI 4320 Credit Principles (Open) (3 q.h.)

Introduction to credit and its functions. Examines the role of the credit executive, credit investigation, documentary credit, trade credit, and organization of the credit department. *Prereq.* FI 4301 or FI 4401.

FI 4325 Budgeting and Planning (Open)

(3 q.h.)

Managerial planning, budgetary control, and financial analysis. Studies the interrelation between functional areas in an organization using consolidated profit planning as an integrating device. Covers fundamental financial analysis, comprehensive profit planning, general expense planning, production planning, materials planning, purchasing. *Prereq.* FI 4401 or FI 4301.

FI 4330 Management of Financial Institutions (3 q.h.)

Operation of bank and nonbank financial institutions and their role in the economy. Discusses operating objectives, services, asset management, and sources of financing and profitability. *Prereq.* FI 4402 or FI 4302.

FI 4335 Bank Management (3 q.h.)

Financial management of commercial banks and thrift institutions. Problems of liquidity and investment management, loan portfolio and capital management, and various pricing problems in the context of a changing economic and regulatory environment.

Lectures, discussions, and case studies.

Prereq. FI 4402 or FI 4302.

FI 4360 Speculative Markets (3 q.h.)

Studies futures contracts and options contracts, their rapid growth in speculative markets, and the uses of these contracts. All of these new instruments have simultaneously increased the complexities of and opportunities in financial markets. Both individual investors and institutional investors such as portfolio managers, banks, multinational corporations, and mutual funds can now minimize their exposure to movements in stock prices, exchange rates, and interest rates by following active and dynamic portfolio strategies that employ these new instruments. *Prereq.* FI 4411 or instructor's permission.

FI 4383 Personal Financial Planning (3 q.h.)

Development of financial planning expertise useful to those considering careers as personal financial planners. Includes budgeting, insurance, taxes, estate planning, basic investment vehicles and strategies, and related legal aspects. *Prereq.* FI 4301 or FI 4401.

FI 4401 Principles of Finance (Reserved)

(3 q.h.)

The scope and nature of finance, introducing basic financial concepts and principles. Includes financial analysis, financial planning, working capital management, the time value of money, and an introduction to financial markets and different types of securities. *Prereq.* ACC 4102 and ECN 4116 and 80 q.h.

FI 4402 Financial Management (Reserved)

(3 q.h.)

Introduction to financial management from both a domestic and an international perspective. Includes valuation, leverage, financial analysis and planning, working capital management, capital budgeting, cost of capital, and long-term and short-term financing decisions. Spreadsheets used. *Prereq.* FI 4401 or 4301 and MIS 4101 and 80 q.h.

FI 4403 Financial Strategy (Reserved) (3 q.h.)

Financial management using the case-method approach. Includes advanced

capital budgeting, capital structure. Decision-making, dividend policy, leasing, convertibles and warrants, mergers, failures and reorganization, and the timing of financial policy. *Prereq. FI 4402 or FI 4302 and 80 q.h.*

FI 4410 Investment Principles (Reserved)
(3 q.h.)

Investment concepts, practices, and procedures. Reviews various types of investments, including the role of security markets and security analysis. *Prereq. FI 4401 or FI 4301 and 80 q.h.*

FI 4411 Investment Management (Reserved)
(3 q.h.)

Relationship between the economy and stock prices. Covers corporate analysis, earnings, dividends, and cash flow and introduces portfolio analysis. Studies technical analysis versus fundamental factors. *Prereq. FI 4410 or FI 4310 and 80 q.h.*

FI 4420 Credit Principles (Reserved) (3 q.h.)

Introduction to credit and its functions. Examines the role of the credit executive, credit investigation, documentary credit, trade credit, and organization of the credit department. *Prereq. FI 4401 or FI 4301 and 80 q.h.*

FI 4421 Credit Management (Reserved)
(3 q.h.)

Forms of credit and collection services, including analysis of financial statements, determination of credit-worthiness, creditors' rights, adjustment bureau operations, credit insurance, and guarantees. *Prereq. FI 4420 or FI 4320 and 80 q.h.*

FI 4425 Budgeting and Planning (Reserved)
(3 q.h.)

Managerial planning, budgetary control, and financial analysis. Studies the interrelation between functional areas in an organization using consolidated profit planning as an integrating device. Covers fundamental financial analysis, comprehensive profit planning, general expense planning, production planning, materials planning, and purchasing. *Prereq. FI 4401 or FI 4301 and 80 q.h.*

FI 4426 Financial Control (Reserved) (3 q.h.)

Development and application of variable budgets, planning and control of capital expenditures, computer applications in profit planning, cash flow planning and control, cost-profit-volume analysis, performance reporting, and analysis of budget variations. *Prereq. FI 4425 or FI 4325 and 80 q.h.*

FI 4450 International Finance (Reserved)
(3 q.h.)

Introduction to international financial management in the multinational corporation. Analyzes basic problems and finance considerations involved with international investments, trade, and payments. Also covers planning in the international environment related to exchange rates, financial strategy, sources of capital, working capital management, fund flows, and management control through accounting and financial reporting. *Prereq. FI 4402 or FI 4302 and 80 q.h.*

FI 4600 Honors Program 1 (4 q.h.)

Opportunity to undertake an in-depth research study project. See page 21 for details. *Prereq. 96 q.h., 3.5 q.p.a.*

FI 4601 Honors Program 2 (4 q.h.)

See FI 4600.

FI 4602 Honors Program 3 (4 q.h.)

See FI 4600.

FI 4701 Independent Study 1 (3 q.h.)

Opportunity to undertake special research. See page 21 for details. *Prereq. 96 q.h., 3.0 q.p.a.*

FI 4702 Independent Study 2 (3 q.h.)

See FI 4701.

FI 4703 Independent Study 3 (3 q.h.)

See FI 4701.

FI 4800 Advanced Tutorial 1 (3 q.h.)

Opportunity to take upper-level course independently. See page 21 for details. *Prereq. 87 q.h.*

FI 4801 Advanced Tutorial 2 (3 q.h.)

See FI 4800.

FI 4900 Field Work (6 q.h.)

Opportunity to enhance career development by applying academic background to practical problems in the workplace. See page 21 for details. *Prereq. Approval of Program Director.*

HEALTH MANAGEMENT

HMG 4100 Hospital Organization and Management 1 (3 q.h.)

Study of hospital organizational structure and administration. Focuses on the complex nature of health administration, its interdependent relationships and organizational strategy.

HMG 4101 Hospital Organization and Management 2 (3 q.h.)

Continuation of HMG 4100, emphasizing organizational issues and management techniques. *Prereq.* HMG 4100.

HMG 4103 Hospital Organization and Management (Intensive) (6 q.h.)

Same as HMG 4100 and HMG 4101.

HMG 4200 Health Science Statistics (3 q.h.)

Designed to give health practitioners the opportunity to learn to apply basic statistical techniques in the gathering, display, and interpretation of health data. Discusses principles of research design and agencies involved in collecting statistical data. *Prereq.* MTH 4111.

HMG 4210 Medical Care and Current Social Problems 1 (3 q.h.)

Presentation of some of the complex dilemmas faced in medical ethics today through lectures, seminars, and case studies. Includes the escalating cost of health care versus the ability to pay; teenage pregnancy; abortion; genetic counseling and screening; behavior control; alcoholism; and the "right to health care."

HMG 4211 Medical Care and Current Social Problems 2 (3 q.h.)

Introduction to such problem areas as child abuse; suicide; euthanasia; the withholding of treatment; the concept and exercise of informed, voluntary consent; patients' rights; the living will; human experimentation; and the allocation of scarce medical resources. *Prereq.* HMG 4210.

HMG 4215 Health Law (3 q.h.)

Basic hospital legal issues relating to corporate and individual liability. Includes an analysis of consent and competency in health care, emphasizing bioethical questions raised by the removal of life-support systems.

HMG 4260 Senior Seminar in Health Care Management (1 q.h.)

A review of current health care management topics, expanding on topics covered in HMG 4429. *Must be taken concurrently with HMG 4429.*

HMG 4300 Home Health Care (3 q.h.)

Programs and techniques for providing effective community home health care and the impact of these programs on the health care delivery system.

HMG 4301 Health Care Delivery Systems (3 q.h.)

The structure, function, and organization of health care services.

HMG 4310 Principles and Practices of Community Health 1 (3 q.h.)

Community health care activities. Emphasizes community health promotion and the coordination and integration of medical and self-care activities with the needs, goals, and resources of the community.

HMG 4311 Principles and Practices of Community Health 2 (3 q.h.)

Continuation of HMG 4310. Emphasizes specific community health problems. *Prereq.* HMG 4310.

HMG 4325 Health Planning and Regulation (3 q.h.)

Analysis of past and present interventions that affect the supply and demand side of the health care system at the community, state, regional, and national levels. Planning and regulations are discussed in the context of political considerations influencing their implementation and effectiveness.

HMG 4390 The Patient's Impact on Decision-Making (3 q.h.)

Explores some of the personal dimensions of illness and treatment and the nature of the relationships between ill people and those trying to care for them. Emphasis on how this interaction effects and influences health management decisions.

HMG 4400 Health Care Financial Management 1 (3 q.h.)

Introduction to health care financial management, including issues in fund accounting, control, and reimbursement. *Prereq.* FI 4101.

HMG 4401 Health Care Financial Management 2 (3 q.h.)

Continuation of HMG 4400. *Prereq.* HMG 4400.

HMG 4429 Health Care Delivery's Changing Environment (2 q.h.)

Health care delivery systems are experiencing a multitude of changes. Keeping up with the changes and anticipating future changes are the subjects covered in a series of five seminars. Topics include quality health care in the '80s, financing health care, alternative health care delivery systems, computers and health care, and future trends.

HMG 4440 Health Care Operations Management (3 q.h.)

An applications-oriented case course focusing on selected operations management planning, restructuring, and control problems common to hospitals and other health service organizations.

HMG 4445 Health Care Marketing and Communication (3 q.h.)

The "how" and "why" of marketing in health care. Presents basic principles, including formulating a marketing plan, strategic marketing practices, and specific marketing for specialized organizations such as HMOs and mental health nursing homes. *Prereq.* MKT 4301.

HMG 4550 Contemporary and Controversial Health Care Issues 1 (3 q.h.)

Study of current health care problems. Emphasizes the interrelationships between the economic, social, political, and environmental factors involved in the development and delivery of health care.

HMG 4551 Contemporary and Controversial Health Care Issues 2 (3 q.h.)

Continuation of HMG 4550. *Prereq.* HMG 4550.

HMG 4580 Information Processing in Health Care (3 q.h.)

Introduction to computer applications and management in health care facilities, including the evolution and application of computer use in health, clinical, and business information

systems; patient care; management; public health; and reimbursement. The information flow of clinical and nonclinical patient data is applied to the principles of information system life-cycle development. The role of the health manager in selecting, implementing, and evaluating information systems for health care facilities is considered.

HMG 4600 Long-Term Care Administration 1* (6 q.h.)

Organization of care for the long-term and chronically ill patient. Examines the goals, purposes, and design of long-term care facilities as well as budgeting, financing, capital funding, and administration. *Prereq.* HMG 4101.

HMG 4601 Long-Term Care Administration 2* (6 q.h.)

Study of internal and external systems pertinent to the long-term care facility. Examines such topics as the nursing unit, the role of the physician, therapies, licensing agencies, hospitals, and methods for improving services. *Prereq.* HMG 4600 or equiv. or permission of Director of Health Professions.

HMG 4602 Long-Term Care Administration 3* (6 q.h.)

Examination of long-term care institutions and their impact on the health care industry. Considers the nature and problems of aging and the care of the elderly in the home, in the community, and in institutions. A general survey and summary of the Massachusetts Nursing Home Administrators Licensure Examination is included. *Prereq.* HMG 4601 or equiv. or permission of Director of Health Professions.

HMG 4610 Principles and Practices of Community Mental Health (3 q.h.)

Introduction to the principles of community mental health, emphasizing the development, implementation, operation, delivery, and use of community mental health services.

**Offered even numbered academic years only.*

HEALTH RECORD ADMIN- ISTRATION

HMG 4650 Health Management Practicum 1 (6 q.h.)

Working in conjunction with a preceptor, the student performs independent work within an administrative setting. Projects include problem identification, data gathering, analysis of alternatives, and implementation of a plan of action. *Students must have completed 75 percent of the degree requirements before registering for this course. Applications for registering must be submitted two full quarters prior to the desired starting date.*

HRA 4302 Medical Terminology Survey (3 q.h.)

Introduction to the medical terminology of a variety of medical disciplines. *Not open to Health Record students.*

HRA 4305 Language of Medicine 1 (2 q.h.)

Analysis and definition of medical terms, including anatomical, diagnostic, operative, symptomatic, and pathological terms.

HRA 4306 Language of Medicine 2 (2 q.h.)

Continuation of HRA 4305. *Prereq. HRA 4305, and courses in anatomy and physiology.*

HRA 4308 Hospital Management for Health Record Administrators (3 q.h.)

Introduction to health care facility management principles. Examines the interaction of the board of trustees, administration, staff, and interdisciplinary departments within a facility as well as licensing and accrediting agencies that set the standards and policies for health care facilities.

HRA 4310 Health Record Science 1 (6 q.h.)

Introduction to health records, covering health record history, numbering, filing, security, and the health record administrator's relationship to the health care facility. Stresses quantitative and qualitative analysis of the

HMG 4651 Health Management Practicum 2 (6 q.h.)

A continuation of HMG 4650.

HMG 4700 Advanced Tutorial 1 (3 q.h.)

Opportunity to take upper level course independently. See page 21 for details. *Prereq. 87 q.h.*

HMG 4701 Advanced Tutorial 2 (3 q.h.)

See HMG 4700.

HMG 4801 Independent Study 1 (3 q.h.)

Opportunity to undertake special research. See page 21 for details.

HMG 4802 Independent Study 2 (3 q.h.)

See HMG 4801.

record; includes laboratory experience. *Prereq. 80 q.h., including BIO 4177 and HRA 4306.*

HRA 4311 Health Record Science 2 (6 q.h.)

Methods of record retention, security, and preservation; laws related to patient care and health records; classification theory; basic disease coding; and word processing and transcription. *Prereq. HRA 4310.*

HRA 4312 Health Record Science 3 (6 q.h.)

Basic principles of compiling statistics for hospital and health facilities. Includes preparation of reports, vital statistics reporting, classification theory, principles of disease coding, and special indices. *Prereq. HRA 4311.*

HRA 4313 Health Record Science 4 (6 q.h.)

Topics include health care legislation, quality assurance, utilization review, PSROs, and planning agencies and their impact on record management. Introduction to specialized record systems. *Prereq. HRA 4312.*

HRA 4314 Health Record Science 5 (6 q.h.)

Continued study of specialized record systems. Includes ambulatory care, home care, and long-term care, approached in terms of information management and quality assurance. Discusses problems presented by changing patterns in health care delivery and reviews current literature. *Prereq. HRA 4313.*

HRA 4320 Organization of the Health Record Department 1 (3 q.h.)

The health record department and its organization, lines of responsibility and authority, and personnel roles and functions. Stresses management principles and practices. *Prereq.* HRA 4308, HRA 4312, and HRA 4324, or *Clinical Coordinator's permission.*

HRA 4321 Organization of the Health Record Department 2 (3 q.h.)

Study of health record department office management problems and their solutions, including quality control, time standards, budgeting, office manuals, and work simplification systems. *Prereq.* HRA 4320.

HRA 4322 Organization of the Health Record Department 3 (3 q.h.)

Advanced management studies designed to address practical applications in health record management. *Prereq.* HRA 4321.

HRA 4330 Health Record Computer Science (3 q.h.)

Electronic data processing in the health record and hospital environment. Assesses state-of-the-art information systems and their future in health record management. *Prereq.* MIS 4101 and HRA 4314.

HRA 4332 Topics in Health Records (3 q.h.)

Current issues in health record administration, focusing on inservice, personnel management, health care finance, and computer applications and trends.

HRA 4335 Clinical Practicum 1 (formerly Applied Health Record Science 1) (3 q.h.)

Clinical practicum in Health Record Science in the general hospital. *Prereq.* HRA 4312.

HRA 4336 Clinical Practicum 2 (formerly Applied Health Record Science 2) (3 q.h.)
Clinical practicum in Health Record Science in specialized health settings. *Prereq.* HRA 4324.

HRA 4337 Clinical Practicum 3 (formerly Applied Health Record Science 3) (3 q.h.)

Clinical practicum in health record management in the health care facility. *Prereq.* HRA 4325.

HRA 4700 Advanced Tutorial 1 (3 q.h.)

Opportunity to take upper-level course independently. See page 21 for details. *Prereq.* 87 q.h.

HRA 4701 Advanced Tutorial 2 (3 q.h.)

See HRA 4700.

**HUMAN
RESOURCES
MANAGEMENT**

HRM 4301 Organizational Behavior (Open) (3 q.h.)

Fundamentals of organizational life, emphasizing the structure and discipline of groups typically found in a business setting. Issues and data related to leadership styles, employee motivation, and organizational dynamics. Requires significant student participation.

HRM 4302 Introduction to Human Resources Management (Open) (3 q.h.)

Introduction to the rights and responsibilities of employer organizations, individual employees, and employee organizations and how they influence personnel and labor relations activities within an organization. *Prereq.* HRM 4301 or HRM 4401.

HRM 4303 Applied Human Resources Management (Open) (3 q.h.)

Goals and structures of various employer and employee organizations are examined and evaluated in terms of effective human resources management. How the collective bargaining process changes in anticipation of future labor-management relations. *Prereq.* HRM 4302 or HRM 4402.

HRM 4304 Organizational Behavior and Introduction to Human Resources Management (Intensive) (Open) (6 q.h.)
Same as HRM 4301 and HRM 4302.

HRM 4310 Personnel Management 1 (3 q.h.)

Study of the role of the human resources manager, the role of the personnel department in personnel planning and selection, and employment development and evaluation programs. Significant student participation required.

HRM 4311 Personnel Management 2 (3 q.h.) Continued examination of human resources management. Includes labor-management relations, compensation programs, safety, and affirmative action functions. Case-study analyses require student participation. *Prereq.* HRM 4310.

HRM 4313 Personnel Management (Intensive) (6 q.h.) Same as HRM 4310 and HRM 4311.

HRM 4320 Techniques of Employee Selection (3 q.h.) Recruitment, selection, and placement techniques, including interviewing and employment testing.

HRM 4321 Wage and Salary Administration (3 q.h.) Wage and salary determination, including merit and incentive plans, wage and salary structure, compensation methods, and the impact of employer-employee relations on compensation systems.

HRM 4322 Employee Benefits (3 q.h.) Study of private and public programs related to job and worker income security. Includes unemployment compensation, training and employment services, private guaranteed income, retirement pension plans, and disability and group insurance.

HRM 4323 Job Evaluation (3 q.h.) Wage-payment systems, wage determination, job elements, rating scales, the writing of job descriptions and specifications, selection of plans, development of wage structures, and principles of merit rating.

HRM 4324 Creative Problem-Solving (3 q.h.) Opportunity to learn and practice new ways of thinking. Discusses ways to sense and analyze problems, develop ideas, and evaluate and implement solutions, and examines the attitudes and climates conducive to creative thinking. Also provides methods for developing imagination, the key part of the creative process.

HRM 4325 Training and Development in Organization (3 q.h.) Explores the basics of training in a variety of settings in organizations.

Special emphasis is placed on training and development as a human resource function by providing an overview of the principles of adult learning, needs assessment, goal setting, and design and evaluation.

HRM 4330 Employment Rights 1 (3 q.h.) Topics include minimum wage, hours of work, overtime, and other pertinent rules and regulations, and child labor laws. Study of laws dealing with health, safety, disability, and compensation for work-related injuries, such as OSHA, ERISA. *Prereq.* HRM 4303 or HRM 4403.

HRM 4331 Employment Rights 2 (3 q.h.) Examination of the old Civil Rights Laws (Sections 1981, 1983, 1985 [3], 1988); Title VI, VII, and IX of the Civil Rights Act of 1964; Age Discrimination in Employment Act; Equal Pay Act; Sections 503 and 504 of the Rehabilitation Act of 1973; Equal Opportunity Act 11246; Affirmative Action and related areas; and current rulings and court decisions regarding discrimination on the basis of race, sex, religion, national origin, age, and disability. *Prereq.* HRM 4330.

HRM 4340 Public and Private Sector Collective Bargaining in the United States (formerly HRM 4341, Private Sector Collective Bargaining in the United States) (3 q.h.) Comparison of critical issues and problems affecting collective bargaining between unions and national, state, and local governments; and between unions and the private domestic sector of the economy. Student participation required. *Prereq.* HRM 4303 or HRM 4403.

HRM 4345 Comparative International Labor Relations Systems (3 q.h.) Comparison and contrast of selected international labor relations systems with that of the United States, including recent developments such as worker participation and co-determination. Research and preparation of position paper by the student; class discussion. *Prereq.* HRM 4303 or HRM 4403.

HRM 4346 Negotiations in Labor Management (3 q.h.)

Negotiation skills, the use of mediation and fact-finding in collective bargaining agreements, the interpretation and application of such agreements, and the use of arbitration. Student participation in simulated negotiation and grievance procedures. *Prereq.* HRM 4303 or HRM 4403.

HRM 4401 Organizational Behavior (Reserved) (3 q.h.)

Fundamentals of organizational life, emphasizing the structure and discipline of groups typically found in a business setting. Issues and data related to leadership styles, employee motivation, and organizational dynamics. Requires significant student participation. *Prereq.* 80 q.h.

HRM 4402 Introduction to Human Resources Management (Reserved) (3 q.h.)

Introduction to the rights and responsibilities of employer organizations, individual employees, and employee organizations and how they influence personnel and labor relations activities within an organization. *Prereq.* HRM 4401 or HRM 4301 and 80 q.h.

HRM 4403 Applied Human Resources Management (Reserved) (3 q.h.)

Goals and structures of various employer and employee organizations are examined and evaluated in terms of effective human resources management. How the collective bargaining process changes in anticipation of future labor-

management relations. *Prereq.* HRM 4402 or HRM 4302 and 80 q.h.

HRM 4404 Organizational Behavior and Introduction to Human Resources Management (Intensive) (Reserved) (6 q.h.)
Same as HRM 4401 and HRM 4402. *Prereq.* 80 q.h.

HRM 4600 Honors Program 1 (4 q.h.)
Opportunity to undertake an in-depth research study project. See page 21 for details. *Prereq.* 96 q.h., 3.5 q.p.a.

HRM 4601 Honors Program 2 (4 q.h.)
See HRM 4600.

HRM 4602 Honors Program 3 (4 q.h.)
See HRM 4600.

HRM 4701 Independent Study 1 (3 q.h.)
Opportunity to undertake special research. See page 21 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

HRM 4702 Independent Study 2 (3 q.h.)
See HRM 4701.

HRM 4703 Independent Study 3 (3 q.h.)
See HRM 4701.

HRM 4800 Advanced Tutorial 1 (3 q.h.)
Opportunity to take upper-level course independently. See page 21 for details. *Prereq.* 87 q.h.

HRM 4801 Advanced Tutorial 2 (3 q.h.)
See HRM 4800.

HRM 4900 Field Work (6 q.h.)
Opportunity to enhance career development by applying academic background to practical problems in the workplace. *Prereq.* Approval of Program Director.

**HEALTH
SCIENCE**

HSC 4210 Basic Nutrition (3 q.h.)

Introduction to nutrition and foods. Focuses on current scientific knowledge of nutrition and how this knowledge can guide an individual toward making appropriate food choices.

HSC 4220 Basic Pharmacology (3 q.h.)

Introduction to the major classes of drugs. Presents the mode of action, common side effects, dosage, pharmaceutical forms, rate and route of administration, and known interactions and toxicities of the most commonly used drugs. *Prereq.* BIO 4177, CHM 4113, or equiv., or instructor's permission.

HSC 4301 Pathophysiology 1 (Formerly Mechanisms of Disease 1) (3 q.h.)
The pathophysiology of major diseases. Discusses diagnosis and treatment, emphasizing inflammation, immunology, infectious disease, oncology, endocrine disorders, and trauma. *Prereq.* BIO 4177 or equiv.

HSC 4302 Pathophysiology 2 (Formerly Mechanisms of Disease 2) (3 q.h.)
Continuation of HSC 4301, using an organ-system approach to disease. Emphasizes cardiovascular, gastrointestinal, pulmonary, and musculoskeletal diseases. *Prereq.* HSC 4301.

HSC 4310 Public Health 1 (3 q.h.)

Study of principles of public health and current mental and physical health problems. Includes communicable diseases, mental health, maternal and child health, official, voluntary, and international health organizations, and alcoholism. Also examines federal, state, and community resources mobilized to aid in prevention, identification, treatment, and rehabilitation.

HSC 4311 Public Health 2 (3 q.h.)

Continuation of HSC 4310. Includes environmental health, chronic diseases, preventive medicine, and public health education.

HSC 4315 Environmental Problems and Health (3 q.h.)

Environmental conditions on land and in the air and water, including the causes of pollution, its effects on human and other life, and a general discussion of current control methods. Emphasizes the significance of environmental problems for the individual.

HSC 4320 Training and Development in the Health Professions 1 (3 q.h.)

Educational program designed for the practitioner, including program planning, teaching strategies, and the development and evaluation of educational objectives.

HSC 4321 Training and Development in the Health Professions 2 (3 q.h.)

Continuation of HSC 4320. Emphasizes program implementation and evaluation and student motivation. *Prereq.* HSC 4320.

HSC 4600 Advanced Nutrition (3 q.h.)

Study of food chemistry, nutrition, and physiology as applied to diet. Includes recent developments in normal nutrition and a critical review of the literature and experimental data on which principles of human nutrition are based. *Prereq.* HSC 4210.

HSC 4601 Advanced Pharmacology (3 q.h.)
Prereq. HSC 4220 or equiv.**HSC 4610 Geriatric Nutrition (3 q.h.)**

Integration of basic nutrition principles with the most current information on the aging process. Reviews

state, local, and federal nutrition programs in terms of services, eligibility, and effect upon the elderly. *Prereq.* knowledge of basic nutrition or instructor's permission.

HSC 5610 Geriatric Nutrition (3 CEUs)

Same as HSC 4610.

HSC 4613 Oral Microbiology* (3 q.h.)

Study of microbiota inhabiting the ecologic niches of the oral cavity. Examines factors that contribute to the role of bacteria in oral pathology, particularly caries and periodontal disease, and the relationship of bacteria and therapy. *Prereq.* BIO 4190.

HSC 4614 Advanced Periodontology 1* (3 q.h.)

Diagnosis, treatment, and control of periodontal diseases, starting with a review of the structure and purposes of the periodontal tissues. Emphasizes the role of the dental hygienist in recognizing and treating disease, motivating and instructing the patient, and carrying out periodontal maintenance therapy. Includes mucogingival problems, furcation involvements, acute gingival infections, root planing, and gingival curettage. *Prereq.* Dental Hygiene Certificate or instructor's permission.

HSC 4615 Advanced Periodontology 2* (3 q.h.)

Latest advances and theories in periodontology. Includes the role of bacteria in pathology, immunopathology, and therapeutic alternatives. Class participation is stressed. *Prereq.* Dental Hygiene Certificate or instructor's permission.

HSC 4700 Advanced Tutorial 1 (3 q.h.)

Opportunity to take upper-level course independently. See page 21 for details. *Prereq.* 87 q.h.

HSC 4701 Advanced Tutorial 2 (3 q.h.)

See HSC 4700.

HSC 4801 Independent Study 1 (3 q.h.)

Opportunity to undertake special research. See page 21 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

HSC 4802 Independent Study 2 (3 q.h.)

See HSC 4801.

HSC 4803 Independent Study 3 (3 q.h.)

See HSC 4801.

**Offered even numbered academic years only.*

HISTORY

HST 4101 The Civilization of the Ancient and Medieval Worlds (formerly History of Civilization 1) (3 q.h.)

Development of human institutions up to the end of the Middle Ages. Emphasizes the continuities and changes that occur within civilizations and the similarities, differences, and relationships that exist among contemporary civilizations around the world. Explores implications of each historical period for our lives today.

HST 4102 The Civilization of the Early Modern World (formerly History of Civilization 2) (3 q.h.)

The period from the end of the Middle Ages to the French Revolution in 1789. Emphasizes the intellectual, technological, and political expansion of Europe and the reactions of the rest of the world to it. Special attention is given to such topics as the rise of dynastic states, the rise and fall of mercantilism, the scientific revolution, exploration and gunpowder technology, and order and revolution.

HST 4103 The Civilization of the Modern World (formerly History of Civilization 3) (3 q.h.)

The world from 1789 to the present. Includes capitalism, industrialization, nationalism, imperialism, the clash of ideologies in the nineteenth century, and a study of total war in the present century. Based on this historical study, the prospects for the future will be explored.

HST 4110 History of Civilization A (4 q.h.)
Major ideas and institutions of civilizations from ancient times to 1648. *For Alternative Freshman-Year students only. Not open to students who have taken HST 4101 or HST 4102.*

HST 4111 History of Civilization B (4 q.h.)
Continuation of HST 4110, covering the period since 1648. *For Alternative Freshman-Year students only. Not open to students who have taken HST 4102 or HST 4103.*

HST 4201 American History 1763-1848 (formerly American History 1) (3 q.h.)
America from 1763 to 1848, with attention to the development of political, economic, and social institutions in the new republic.

HST 4202 American History 1848-1917 (formerly American History 2) (3 q.h.)
The United States from 1848 to 1917, with attention to the Civil War, economic development thereafter, and the Progressive Era.

HST 4203 American History Since 1917 (formerly American History 3) (3 q.h.)
The United States since 1917, an age of urbanized industrialism and international involvement and crisis.

HST 4241 The Historian's Craft (3 q.h.)
Discussion of ways in which the historian studies the past, with emphasis on research and writing.

HST 4263 Oral History (3 q.h.)
Learning history from those who lived it. Students conduct tape-recorded interviews of first-hand experiences in a selected area of twentieth-century history. Students need access to an audiotape recorder.

HST 4265 Introduction to Public History (3 q.h.)
Topics include the new discipline of public historical archiving, the construction of historical displays and exhibits, the preservation and restoration of historic sites and structures, the editing of historical documents and journals, the operation of historical societies, and the production of historical media programs.

HST 4301 Technological Transformation of Society (3 q.h.)

The relation between technological innovations and the world in which they take place. Discusses conditions necessary for discovery and innovation and the impact of technology on the political, economic, and social environment. (Thematic Group D)

HST 4302 History of Flight and Space (3 q.h.)
Beginning with the ancient Greeks' and Leonardo da Vinci's dreams of flight, the course traces the history of nonpowered flight from the balloon experiments of the Montgolfier brothers to contemporary hang-gliders; of powered flight from the Wright brothers through supersonic transport; and of rocketry and space travel from their beginnings through the *Enterprise*. (Thematic Group D)

HST 4303 History of the Automobile (3 q.h.)
History of the automobile in Europe and America. Includes invention, production, impact on social and economic life, and the problems of pollution and energy. (Thematic Group D)

HST 4304 History of Energy (3 q.h.)
Examination of how human beings have mobilized the forces of nature to survive, to alter and improve their lifestyles, and to dominate their fellow human beings. Emphasizes the transformation from one energy source to the available alternatives and the reasons for the choices made. Includes the change from human power to animal and machine power, the energy crisis of the sixteenth century, the turning from wood to water and coal power, the rising use of electricity and fossil fuels, the birth of the Atomic Age, and the contemporary history of the oil crisis. (Thematic Group D)

HST 4305 Health and Sickness: Historical Perspectives (3 q.h.)
Survey of medical theories from ancient times to the present, emphasizing concepts of disease causation and the health care systems or institutions derived from them. Medical theory and practice are related to both the general history of the period and the particular political, economic, or social circumstances that influenced attitudes regarding health care. (Thematic Group D)

HST 4401 Ancient Middle East (3 q.h.)
Study of ancient cultures and peoples in the Middle East to the rise of Islam.

HST 4403 History of the Jews 1 (3 q.h.)
Cultural and intellectual survey of the Jews from the end of antiquity to early modern times.

HST 4404 History of the Jews 2 (3 q.h.)
Role and position of the Jews in modern history. (Thematic Group A)

HST 4407 Ancient Greece (3 q.h.)
Origin and development of Greek civilization.

HST 4408 Ancient Rome (3 q.h.)
Ancient Roman civilization, emphasizing the rise of the Republic and the decline of the Empire.

HST 4410 The Middle Ages (3 q.h.)
History of Europe from the fall of Rome to 1350.

HST 4412 Islamic History (3 q.h.)
History of the Muslim Arab world from the seventh century to the end of the Abbasid Caliphate in 1258.

HST 4420 Renaissance and Reformation (3 q.h.)
History of Europe from 1350 to 1648, with attention to intellectual, religious, political, and economic developments.

HST 4424 Europe 1870-1921 (3 q.h.)
Background of World War I, including nationalism, militarism, imperialism, and the alliance system, as well as the making of war and peace. (Thematic Group C)

HST 4425 Europe Since 1921 (3 q.h.)
Europe after World War I; World War II; the Cold War; and the efforts to unify the continent. (Thematic Group C)

HST 4434 Family History (3 q.h.)
History of the family in Europe and America from 1600 to the present. Includes the changing nature and role of the family, marriage and divorce, child rearing, and aging. (Thematic Group E)

HST 4435 Women in European History (3 q.h.)
Historical examination of the position and role of women in European life. (Thematic Group E)

HST 4443 European Intellectual History Since 1815 (3 q.h.)
Main currents of European thought from Romanticism to the present and their social and political contexts.

HST 4455 Ireland Since 1800 (3 q.h.)
The Irish question in British politics from the Act of Union to the present. (Thematic Group A)

HST 4460 Hitler's Germany (3 q.h.)
Origins and nature of Hitler's Third Reich, emphasizing the personal lives of Nazi leaders in an attempt to understand how seemingly ordinary people could enthusiastically promote wars of aggression and revel in genocidal policies. (Thematic Group C)

HST 4466 Eastern Europe Since 1500 (3 q.h.)

An examination of the salient historical factors which have driven the evolution of Eastern Europe from the Congress of Buda in 1500 which allied Poland and Hungary in anticipation of German and Russian encirclement through the fateful year 1989 which introduced the end of the Iron Curtain and post-World War II domination by the Soviet Union.

HST 4467 Russia to 1917 (3 q.h.)

Emergence of Russia as a recognized European power; history of the Russian people and government to the revolutions of 1917.

HST 4468 Russia Since 1917 (3 q.h.)

The revolutions of 1917 and the subsequent history of the Russian people and government, with special emphasis on foreign relations. (Thematic Group C)

HST 4469 Russian Expansionism (3 q.h.)

Russia's quest for territory after 1500, with attention to the conquest of neighboring territories, the Sino-Russian disputes, and current issues in Soviet geopolitics. (Thematic Group C)

HST 4473 Poland in the Twentieth Century (3 q.h.)

Examines forces leading to Poland's national resurrection in 1918 after more than a century of being a nation without sovereignty; the interwar years of reconstruction and consolidation; partition and near annihilation by Hitler and Stalin in World War II; Cold War engulfment by Communism; Solidarity and the achievement of freedom.

HST 4501 American Indians (3 q.h.)

Survey of native Americans from pre-Columbian times to the present. (Thematic Group A)

HST 4502 Colonial America (3 q.h.)

Topics include exploration and settlement of North America; the development of political, social, and economic institutions; and the international rivalry to 1763.

HST 4503 The American Revolution (3 q.h.)

British-American relations after 1763; war and peace.

HST 4505 The Making of the American Constitution (3 q.h.)

Beginning with the weaknesses of the Articles of Confederation, this course examines the movement for a stronger national government, the drafting of the Constitution and the first twelve amendments, and their implementation in the early years of the Republic.

HST 4506 American Constitutional History, 1835-1910 (3 q.h.)

American constitutional development in the time of Chief Justice Taney; the constitutional impacts of secession and Civil War; post-Civil War Supreme Court cases involving economic affairs, social problems, and individual rights in the terms of Chief Justices Chase, Waite, and Fuller.

HST 4507 American Constitutional History Since 1910 (3 q.h.)

American constitutional development from the Progressive Era to the present, with attention to amendments to the Constitution, the growth of the national government, and Supreme Court cases involving economic affairs, civil liberties, and civil rights.

HST 4508 American Constitutional History: Legislative, Executive, and Judicial Powers (3 q.h.)

An in-depth study of the ways in which the three branches of the American government have exercised the powers afforded them by the Constitution since 1788. Emphasis on the tax and commerce powers of Congress, the foreign affairs and war powers of the President, and the review power of the Supreme Court.

HST 4509 American Constitutional History: Liberties, Privileges, and Immunities (3 q.h.)

An in-depth exploration of the historical evolution of various rights protected by the American Constitution. Topics include freedom of speech, press, association, and religion; equal protection; and the right to privacy.

HST 4511 Populism and Progressivism (3 q.h.)

Topical history of the United States from 1890 to 1920, concentrating on its reactions to industrialization and urbanization.

HST 4512 The Age of Roosevelt (3 q.h.)

Topical history of the United States in time of world war, prosperity, depression, and war again.

HST 4513 Contemporary America (3 q.h.)

The American people from the close of World War II to the present. (Thematic Group C)

HST 4523 American Diplomatic History

(3 q.h.)

Selected topics in the history of American foreign relations and policy since 1789.

HST 4530 American Economic History

(3 q.h.)

Selected topics in the development of the capitalist economy in the United States, with attention to the role of government since 1789. (Thematic Group B)

HST 4531 American Business History (3 q.h.)

Examines the rise of business in America, the role of the corporation, horizontal and vertical combinations, business and labor, and business and government.

HST 4540 American Social History (3 q.h.)

Selected topics in the life of the American people since 1789. (Thematic Group B or E)

HST 4542 Women in American History (3 q.h.)

Historical examination of the position and role of women in American life. (Thematic Group B or E)

HST 4543 African-American History (3 q.h.)

History of African Americans from colonial times to the present. (Thematic Group A)

HST 4546 Americans at Play: A History of Leisure (3 q.h.)

An examination of 300 years of leisure from the colonial quilting bee to modern professional football, with special attention to class, gender, and ethnicity and to attempts to regulate leisure activity. (Thematic Group B)

HST 4547 History of Sport in America

(3 q.h.)

History of the major sports and their impact on American life. (Thematic Group B)

HST 4548 American Heroes (3 q.h.)

Comparative exploration of the nature and functions of heroism in American history, using such individuals as George Washington, Jesse James, Amelia Earhart, Martin Luther King, and Bruce Springsteen as specific case studies. (Thematic Group B)

HST 4549 American Inquisitions (3 q.h.)

Study of inquisitions in modern America, concentrating on the suppression of radical movements by both government and private groups. (Thematic Group C)

HST 4550 Boston to 1822 (3 q.h.)

Study of the Town of Boston from its establishment in 1630 to 1822 and the development of political, economic, and social institutions.

HST 4551 Boston Since 1822 (3 q.h.)

Study of the City of Boston, its annexations, and the changes in the ethnic nature of the population.

HST 4602 Contemporary Latin America

(3 q.h.)

Social, economic, and political development of the Latin American republics in the twentieth century. (Thematic Group A or C)

HST 4603 The United States, Central America, and the Caribbean (3 q.h.)

Latin American countries nearest the United States and most affected by U.S. policies, particularly Cuba, Mexico, Nicaragua, El Salvador, and Guatemala. Emphasizes the historical background of current issues. (Thematic Group C)

HST 4604 Mexico Since 1848 (3 q.h.)

Political, economic, social, and cultural evolution of Mexico since the Mexican-American War. Other topics and issues include the Juarez *Reforma*, Diaz's dictatorship, the Revolution of 1910, and the on-going Institutional Revolution.

HST 4606 Canadian History (3 q.h.)

The history of Canada from the time of the European settlement to the present, with emphasis on Canadian relations with the U.S. and the background of the Quebec separatist movement.

HST 4611 Africa Since 1885 (3 q.h.)

The European impact on Africa, the rise of African nationalism, and the emergence of independent African states and their relations with other nations. (Thematic Group C)

HST 4622 Modern Middle East (3 q.h.)

The Middle East since 1914, with attention to Zionism, Pan-Arabism, the effects of two world wars, and the postwar settlements. (Thematic Group C)

HST 4632 China Since 1850 (3 q.h.)

A century of China's history, emphasizing the Western impact on Chinese civilization, China's struggle to maintain independence, and the victory of communism in the mid-twentieth century. (Thematic Group A)

HST 4636 Japan Since 1850 (3 q.h.)

Analysis of Japanese domestic developments and foreign relations since the mid-nineteenth century. (Thematic Group A)

HST 4640 Third World Women (3 q.h.)

Role of women in the less developed, Third World areas, with special emphasis on aspects of change, development, and continuity. (Thematic Group E)

HST 4641 Global Women's Movement (3 q.h.)

Examination of the origins, issues, organizations, networks, and resources of the global women's movement. Attention is given to the place of the U.S. women's movement within this global movement, the movement in developing countries, and the role of the United Nations Conferences on Women in fostering the movement's development. (Thematic Group E)

HST 4644 War and Peace in the Nuclear Age (3 q.h.)

The history of the nuclear age based on a Corporation for Public Broadcasting/Annenberg telecourse. By incorporating a variety of perspectives on the nuclear past—political, historical, philosophical, and scientific—the programs, lectures, and accompanying print materials provide students with a solid foundation of knowledge upon

which they can base their views of the nuclear future. (Thematic Group C)

HST 4645 History of the Vietnam Wars (3 q.h.)

History of military conflict in Vietnam, with attention to the rise of the Viet Minh during World War II, the struggle against the French in the first Indochina War, the impact of the Cold War, and the involvement of the United States after 1950 in Laos and Cambodia (now Kampuchea) as well as in Vietnam. Emphasizes the role of communism and nationalism in Indochina and the motives for American intervention. Includes films revealing American reaction to the escalating conflict. (Thematic Group C)

HST 4646 The Legacy of the Vietnam Wars (3 q.h.)

Examines the impact of the American involvement in Vietnam on American foreign and domestic policy as well as on American attitudes toward themselves and toward the world in the period since 1975. Emphasis will be placed on post-war interpretations of that conflict, on its effects on American ideals, on ideas of military preparedness, on the economy, on popular culture, and on the "healing processes" that have marked the last decade. An assessment of the extent to which Vietnam continues to haunt the American people and the extent to which the country has put the experience behind it will be made and an agenda for future action set forth by the class. (Thematic Group C)

HST 4811 Honors Program 1 (4 q.h.)

Opportunity to undertake an in-depth research study project. See page 21 for details. *Prereq.* 96 q.h., 3.5 q.p.a. (Thematic Group F)

HST 4812 Honors Program 2 (4 q.h.)

See HST 4811.

HST 4813 Honors Program 3 (4 q.h.)

See HST 4811.

HST 4815 Advanced Tutorial 1 (3 q.h.)

Opportunity to take an upper-level course independently. See page 21 for details. *Prereq.* 87 q.h.

HST 4816 Advanced Tutorial 2 (3 q.h.)

See HST 4815.

HST 4821 Field Work in History (6 q.h.)

Designed to enhance career development by allowing students to earn credit for the application of their academic backgrounds to practical problems in the work place. See page 21 for details. *Prereq.* HST 4101, 4102, 4103, 4202, 4203, 4241, and Program Director's approval.

HST 4822 Independent Study 1 (3 q.h.)

Opportunity to undertake special research. See page 21 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

HST 4823 Independent Study 2 (3 q.h.)

See HST 4822.

HST 4824 Independent Study 3 (3 q.h.)

See HST 4822.

HOTEL AND RESTAURANT MANAGEMENT

HTL 4301 Introduction to Hotel and Restaurant Management (3 q.h.)

The hospitality industry in today's economy. Emphasis is on industry growth and development, management problems, and principles of hotel and restaurant management.

HTL 4303 Front Office Management (3 q.h.)

Role and functions of the front office as they relate to the operation of the entire hotel. Covers front office structure, registration, payment, reservations, and night audit.

HTL 4304 Hotel and Restaurant Law (3 q.h.)

Introduction to the fundamental laws, rules, and regulations applicable to the hospitality industry. Includes hospitality management policies that minimize the danger of legal liability; innkeeping; restaurant management; alcoholic beverage control; labor laws; and legislation affecting the hospitality industry.

HTL 4305 Food Preparation 1 (3 q.h.)

Introduction to the fundamentals of food preparation and service, with emphasis on food service industry terminology and equipment. Includes menu planning, requisitioning, pricing, and preparation and service. In addition to classroom instruction, students prepare food in a small-quantity laboratory. (Laboratory fee.)

HTL 4306 Food Preparation 2 (3 q.h.)

Continuation of HTL 4305. *Prereq.* HTL 4305. (Laboratory fee.)

HTL 4307 Food Service Sanitation (3 q.h.)

Organization of the maintenance and engineering function. Includes the technical information necessary to establish effective preventive pro-

grams. Details the fundamentals of sanitation for food service employees and includes practical guidelines for safe food handling. Provides the future hospitality manager with an opportunity for certification in Applied Food Service Sanitation from the National Institute for the Food Service Industry.

HTL 4308 Food and Beverage Cost Control (3 q.h.)

Introduction to management attitudes toward cost controls through analysis of all aspects of the food service operation. Includes classification of food service facilities, cost accounting, purchasing, inventory, production control methods, and the essentials of food and beverage controls. Develops management-mindedness through examination of organizational structures of food service and specific topics, such as menu pricing, break-even analysis, and cost-volume-profit theory. Emphasizes forecasting and achieving a profitable bottom line.

HTL 4309 Managerial Accounting for the Hospitality Industry (3 q.h.)

Financial practices and systems used in the hospitality industry. Analyzes controls, budgeting, financial statements, and specialized industry accounting procedures. *Prereq.* ACC 4102.

HTL 4310 Hospitality Marketing Management (3 q.h.)

The market in which the hospitality industry operates. Students have the opportunity to develop and implement a marketing plan to meet operational goals. *Prereq.* MKT 4301.

HTL 4313 Introduction to Tourism (3 q.h.)
Introduction to the science, art, and business of attracting, transporting, and accommodating visitors and graciously catering to their needs and wants. Includes sociological and psychological aspects, marketing, and the economics of tourism.

HTL 4320 Food Preparation (Intensive) (6 q.h.)
Same as HTL 4305 and HTL 4306.

HTL 4322 Consumer Food Preparation (3 q.h.)
Concepts and skills learned in HTL 4305 and HTL 4306 are applied in a restaurant setting. Preparation of complete menus for a service dining room, including appetizers, soups, salads, entrees, vegetables, and desserts. Stresses costing, menu planning, quantity recipe production, menu terminology, and kitchen organization. Coordinates food production with students in the dining room service course (HTL 4324). Work in a classic kitchen stations on a rotating basis. *Prereq.* HTL 4306 or HTL 4320.

HTL 4324 Dining Room Beverage Operation and Preparation (3 q.h.)
Introduction to the operation of a dining room with beverage service. Includes organization, personnel, methods of table service, menu terminology, table arrangement, requirements for supplies and equipment, sales promotion techniques, and revenue control. Students serve meals prepared by students in the food production course (HTL 4322). Also covers wine service and alcoholic beverage preparation and control. *Prereq.* HTL 4301.

HTL 4330 Advanced Catering/Garde Manger (formerly HTL 4326 The Joy of Catering) (6 q.h.)
Capstone course in culinary science, sharpening skills in this area. Teaches fancy hor d'oeuvres preparation (garde manger). Faculty includes executive chefs from Boston's finest hotels and restaurants.

HTL 4331 Professional Chef's Training (formerly HTL 4325 Intensive Chef's Training) (6 q.h.)
This course is for the individual who already has a culinary background and wishes to continue to upgrade his/her skills and understanding of the changing role of today's food industry. The course explores two avenues, a greater understanding between chef and management, along with the preparation of finer cuisine for hotels, restaurants, clubs, catering and buffet. The practical demonstrations will include hors d'oeuvres, through to fancy desserts. Tableside and wine cookery, ice carving and extensive menu planning will be included. An all-round way to gain more culinary expertise.

HTL 4600 Honors Program 1 (4 q.h.)
Opportunity to undertake an in-depth research study project. See page 21 for details. *Prereq.* 96 q.h., 3.5 q.p.a.

HTL 4601 Honors Program 2 (4 q.h.)
See HTL 4600.

HTL 4602 Honors Program 3 (4 q.h.)
See HTL 4600.

HTL 4701 Independent Study 1 (3 q.h.)
Opportunity to undertake special research. See page 21 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

HTL 4702 Independent Study 2 (3 q.h.)
See HTL 4701.

HTL 4703 Independent Study 3 (3 q.h.)
See HTL 4701.

HTL 4800 Advanced Tutorial 1 (3 q.h.)
Opportunity to take upper-level course independently. See page 21 for details. *Prereq.* 87 q.h.

HTL 4801 Advanced Tutorial 2 (3 q.h.)
See HTL 4800.

HTL 4900 Field Work (6 q.h.)
Opportunity to enhance career development by applying academic background to practical problems in the workplace. See page 21 for details. *Prereq.* Approval of Program Director.

OPERATIONS MANAGEMENT

IM 4301 Introduction to Operations Management (Open) (3 q.h.)

Concepts and principles related to the management of operation functions, taught from a management point of view. Relationships to other business functions. Operations, as a transformation process, with inputs of materials, investment, and people producing finished goods/services. Topics covered include product and process design, forecasting demand, capacity planning, facilities design, aggregate planning, scheduling, and quality control and assurance. *Prereq.* MS 4325.

IM 4302 Operations Analysis (3 q.h.)

Structuring problems and the application of analytical techniques in the development of solutions to operating systems problems. Topics covered include operations planning and scheduling, analyzing operating performance, quality issues, facilities layout, materials planning, and workforce planning. Examination of the operations audit as it relates to manufacturing and service organizations developed as a tool for operations analysis. *Prereq.* IM 4401 or IM 4301.

IM 4314 Productivity Enhancement and Quality (formerly Production Control and Inventory Management) (3 q.h.)

The fields of quality control and productivity as a body of managerial, technological, behavioral, and economic knowledge, together with the organized application of this knowledge to the practical improvement of operations. Introduction to various productivity improvement programs currently in use, including measurement and control; the relationship between increase in productivity and managing for higher quality. Reviews management practices of modern quality control and the different approaches to optimizing quality. Includes the economics of total quality, internal and external quality, and management of long-term quality and reliability. *Prereq.* MS 4332.

IM 4317 Purchasing and Materials Management (formerly Materials Management) (3 q.h.)

Development and analysis of factors

considered in the acquisition process and subsequent management of the materials function. Examines the relationships among price, quality, and delivery performance. Topics covered include the make-or-buy decision, corporate purchasing strategies, setting customer service levels, inventory analysis, facility location, storage and material handling, and selection of the transportation mode. *Prereq.* IM 4401 or IM 4301.

IM 4321 Operations Planning and Control (formerly Management and Operational Control Systems) (3 q.h.)

The nature of control in general and the specific characteristics of management and operations control. Examines control structures, processes, and bases for design and implementation. *Prereq.* IM 4401 or IM 4301.

IM 4326 Operations Management Policy (3 q.h.)

Analyses of complex operating situations faced by business managers. Students are exposed to integrative cases and are expected to identify problems in organizations, to develop viable courses of action, to conduct detailed analyses, and to identify a set of recommendations and an implementation strategy. *Prereq.* IM 4314, IM 4317, IM 4321.

IM 4401 Introduction to Operations Management (Reserved) (formerly Operations Management) (3 q.h.)

Concepts and principles related to the management of operation functions, taught from a management point of view. Relationships to other business functions. Operations, as a transformation process, with inputs of materials, investment, and people producing finished goods/services. Topics covered include product and process design, forecasting demand, capacity planning, facilities design, aggregate planning, scheduling, and quality control and assurance. *Prereq.* MS 4325 and 80 q.h.

IM 4600 Honors Program 1 (4 q.h.)

Opportunity to undertake an in-depth research study project. See page 21 for details. *Prereq.* 96 q.h., 3.5 g.p.a.

IM 4601 Honors Program 2 (4 q.h.)

See IM 4600.

IM 4602 Honors Program 3 (4 q.h.)

See IM 4600.

IM 4701 Independent Study 1 (3 q.h.)

Opportunity to undertake special research. See page 21 for details.

Prereq. 96 q.h., 3.0 q.p.a.

IM 4702 Independent Study 2 (3 q.h.)

See IM 4701.

IM 4703 Independent Study 3 (3 q.h.)

See IM 4701.

IM 4800 Advanced Tutorial 1 (3 q.h.)

Opportunity to take upper-level course independently. See page 21 for details.

Prereq. 87 q.h.

IM 4801 Advanced Tutorial 2 (3 q.h.)

See IM 4800.

IM 4900 Field Work (6 q.h.)

Opportunity to enhance career development by applying academic background to practical problems in the workplace. See page 21 for details.

Prereq. Approval of Program Director.

INTER-DISCIPLINARY

INT 4110 Managing Career Decisions (3 q.h.)

Understanding the importance of taking control of one's life and career decisions. Students complete a self-assessment including an evaluation of skills and competencies, values, interests, and personal style. Students explore a variety of career options both through library research and field surveys. Emphasis on decision making, goal setting, and implementing career and educational plans. Overview of job campaign includes introduction to resume preparation, network development, and interviewing techniques.

INT 4200 The Creative Process (3 q.h.)

Thought processes that allow individuals to be creative or original. Through interactive exercises and special projects in composition and problem solving, students can learn how to tap their own creativity. Students are asked to create an original piece of art, music, literature, or research.

INT 4201 Cultural Heritage Seminar (3 q.h.)

Study of the interconnected ways in which art, music, literature, religion, and specific historical events have shaped our culture, values, and self-perceptions. Students undertake projects dealing with one or more themes included in their Cultural Heritage Studies. *Prereq.* 27 q.h. in *Cultural Heritage Studies* (see *Liberal Studies* program, page 111) or instructor's permission.

INT 4202 Contemporary Studies Seminar (3 q.h.)

Analysis and discussion of selected problems of the contemporary world, using analytical tools appropriate to the disciplines contained within the Liberal Studies curriculum. *Prereq.* 27 q.h. in *Contemporary Studies* (see *Liberal Studies* program, page 111) or instructor's permission.

JOURNALISM

JRN 4112 Writing for Media 1 (formerly

Fundamentals of Newswriting) (3 q.h.)

Introduction to how to write leads, organize basic news stories, gather facts, and interview. Analyzes news values and the structure of news organizations.

JRN 4113 Writing for Media 2 (formerly

Newsgathering and Reporting) (3 q.h.)
Writing of multisource stories, both news and feature; public affairs reporting; advanced interviewing techniques; and legal issues. *Prereq.* JRN 4112 or equiv.

JRN 4114 News Reporting Techniques

(3 q.h.)

Introduction to writing in-depth stories requiring significant research and introduction to investigative reporting. Includes libel, privacy invasion, and other legal matters affecting news media. *Prereq.* JRN 4113 or instructor's permission.

JRN 4250 Interpreting the News (3 q.h.)

The impact, both good and bad, of newspapers, television, radio, and other news media on American life. Examines how news is gathered, processed, and disseminated by the various

media. "How much do we need the press as a watchdog on government?" and "Who is watching the watchdog?" are among the questions addressed.

JRN 4300 Photojournalism (3 q.h.)

Introduction to how to use the camera, the negative, and the print in news or feature stories. Includes weekly photo shooting assignments and darkroom work. (Laboratory fee.)

JRN 4330 The Newspaper Cartoon: Its Techniques and History (3 q.h.)

How the political cartoon and comic strip have influenced American culture from the late 1800s through the 20th century. This course is for those interested in the political scene as well as those interested in careers in cartooning. Being an artist is not a prerequisite.

JRN 4335 Public Relations Basics (3 q.h.)

Concepts, components, and methods of public relations, including planning and research, processes of influencing public opinion, and policies concerning corporate and institutional relations with the media and various publics.

JRN 4336 Public Relations Practices (3 q.h.)

Study of specific practices and techniques employed in public relations, especially in relation to the handling of information and organization of activities and events. Also discusses how to define PR "targets" and how to deal with such publics as employees, stockholders, and consumers.

JRN 4337 Public Relations Problems (3 q.h.)

Research and communication techniques used to solve public relations problems and practical experience with individual PR projects, programs, and campaigns.

JRN 4340 Press Power and Critical Issues (3 q.h.)

Study of the impact of news media coverage on major political, economic, and other issues. The increasingly complex relationship between American society and print and broadcast journalism is analyzed.

JRN 4349 Advertising Basics (3 q.h.)

Study of the evolution of advertising, including social, economic, and legal aspects; how advertising agencies and departments function; how advertising fits into the marketing mix; and the basic steps of research.

JRN 4350 Advertising Copywriting (3 q.h.)

Writing effective advertising copy for both print and electronic media; coordinating copy with other creative functions. Elements of good ad copy are analyzed and common pitfalls are reviewed.

JRN 4351 Advertising Practice (3 q.h.)

Study of media planning and selection. Includes defining objectives and determining target audiences; establishing the advertising budget; analyzing the market and the competition.

JRN 4480 Copyediting (3 q.h.)

Practice in the many facets of the editorial process, including editing copy, writing heads, and laying out pages. The course also includes photo selection, cropping, and outline writing. *Prereq. JRN 4112.*

JRN 4522 Magazine Writing (3 q.h.)

Practice in writing and freelancing magazine articles. Analysis of magazine markets, preparation of query letters, techniques of research, and submission of manuscript. Travel, how-to, profile, personal experience, and other formats included.

JRN 4540 Writing the Non-Fiction Book (3 q.h.)

This course surveys today's market for the journalistic, non-fiction book and describes methods for selecting a researchable topic, finding the facts, writing the query letter, writing the manuscript, and doing revisions and final draft. By the end of the course, the student submits, among other things, three manuscript chapters.

JRN 4560 Developing Writing Style (3 q.h.)

Developing and refining personal style in journalistic, non-fiction writing. Emphasis is placed on original and effective approaches to features, columns, reviews, editorials and longer works.

LANGUAGE— ARABIC

LNA 4101 Elementary Arabic 1 (4 q.h.)
Introduction to the Arabic language and culture through speaking, reading, and some writing.

LNA 4102 Elementary Arabic 2 (4 q.h.)
Continuation of LNA 4101 with practice in elementary conversation,

reading, and writing. *Prereq.* LNA 4101 or *equiv.*

LNA 4103 Elementary Arabic 3 (4 q.h.)
Continuation of LNA 4102, building the basic skills necessary to carry on a conversation. *Prereq.* LNA 4102 or *equiv.*

LANGUAGE— FRENCH

LNF 4101 Elementary French 1 (4 q.h.)
Essentials of grammar, practice in pronunciation, and progressive acquisition of a basic vocabulary and idiomatic expressions.

LNF 4102 Elementary French 2 (4 q.h.)
Continuation of grammar study, with oral and written exercises. *Prereq.* LNF 4101 or *equiv.*

LNF 4103 Elementary French 3 (4 q.h.)
Reading of French prose of increasing difficulty, with written and oral exercises based on the materials read and practice in conversation. *Prereq.* LNF 4102 or *equiv.*

LNF 4104 Intermediate French 1 (4 q.h.)
Review of grammar, with practice in composition and conversation. *Prereq.* LNF 4103 or *equiv.*

LNF 4105 Intermediate French 2 (4 q.h.)
History of French civilization, with

discussions and conversation. *Prereq.* LNF 4104 or *equiv.*

LNF 4106 Intermediate French 3 (4 q.h.)
Intensive reading of modern French prose, with practice in conversation. *Prereq.* LNF 4105 or *equiv.*

LNF 4815 French Advanced Tutorial 1 (4 q.h.)
Advanced Tutorial Option: When a student is unable to continue study of an upper-level language, or when a language course needed for a degree is not scheduled at appropriate intervals, arrangements can be made for the student to take three advanced tutorials for a total of twelve quarter hours. See page 21 for details. *Prereq.* 87 q.h.

LNF 4816 French Advanced Tutorial 2 (4 q.h.)
See LNF 4815.

LNF 4817 French Advanced Tutorial 3 (4 q.h.)
See LNF 4815.

LANGUAGE— GERMAN

LNG 4101 Elementary German 1 (4 q.h.)
Essentials of grammar, practice in pronunciation, and progressive acquisition of a basic vocabulary and idiomatic expressions.

LNG 4102 Elementary German 2 (4 q.h.)
The more difficult points of grammar, particularly the uses of the subjunctive mood. *Prereq.* LNG 4101 or *equiv.*

LNG 4103 Elementary German 3 (4 q.h.)
Reading of simple German prose, with oral and written exercises based on material read. Conversation in German is encouraged. *Prereq.* LNG 4102 or *equiv.*

LNG 4104 Intermediate German 1 (4 q.h.)
Review of grammar, with practice in composition and conversation. *Prereq.* LNG 4103 or *equiv.*

LNG 4105 Intermediate German 2 (4 q.h.)
History of German civilization, with discussions and conversation. *Prereq.* LNG 4104 or *equiv.*

LNG 4106 Intermediate German 3 (4 q.h.)
Intensive reading of modern German prose, with practice in conversation. *Prereq.* LNG 4105 or *equiv.*

LNG 4815 German Advanced Tutorial 1 (4 q.h.)
Advanced Tutorial Option: When a student is unable to continue study of an upper-level language, or when a language course needed for a degree is not scheduled at appropriate intervals, arrangements can be made for the student to take three advanced tutorials for a total of twelve quarter hours. See page 21 for details. *Prereq.* 87 q.h.

LNG 4816 German Advanced Tutorial 2 (4 q.h.)
See LNG 4815.

LNG 4817 German Advanced Tutorial 3 (4 q.h.)
See LNG 4815.

LANGUAGE— HEBREW

LNH 4101 Beginning Conversational Hebrew 1 (4 q.h.)

Acquisition of basic oral skills by introduction of the essentials of Hebrew grammar. Includes extensive practice in pronunciation and acquisition of an idiomatic core vocabulary.

LNH 4102 Beginning Conversational Hebrew 2 (4 q.h.)

Continuation of LNH 4101. Introduces Hebrew prose of moderate difficulty. *Prereq.* LNH 4101 or equiv.

LNH 4103 Beginning Conversational Hebrew 3 (4 q.h.)

Continuation of LNH 4102. Continued emphasis on conversation and on building a solid vocabulary. *Prereq.* LNH 4102 or equiv.

LANGUAGE— ITALIAN

LNI 4101 Elementary Italian 1 (4 q.h.)

Essentials of grammar, practice in pronunciation, and progressive acquisition of a basic vocabulary and idiomatic expressions.

LNI 4102 Elementary Italian 2 (4 q.h.)

Continuation of grammar study, with oral and written exercises. *Prereq.* LNI 4101 or equiv.

LNI 4103 Elementary Italian 3 (4 q.h.)

Reading of Italian prose of increasing difficulty, with written and oral exercises based on the material read. Practice in conversation. *Prereq.* LNI 4102 or equiv.

LNI 4104 Intermediate Italian 1 (4 q.h.)

Review of grammar, with practice in composition and conversation. *Prereq.* LNI 4103 or equiv.

LNI 4105 Intermediate Italian 2 (4 q.h.)

History of Italian civilization, with discussions and conversation. *Prereq.* LNI 4104 or equiv.

LNI 4106 Intermediate Italian 3 (4 q.h.)

Intensive reading of modern Italian prose, with practice in conversation. *Prereq.* LNI 4105 or equiv.

LNI 4815 Italian Advanced Tutorial 1 (4 q.h.)

Advanced Tutorial Option: When a student is unable to continue study of an upper-level language, or when a language course needed for a degree is not scheduled at appropriate intervals, arrangements can be made for the student to take three advanced tutorials for a total of twelve quarter hours. See page 21 for details. *Prereq.* 87 q.h.

LNI 4816 Italian Advanced Tutorial 2 (4 q.h.)
See LNI 4815.

LNI 4817 Italian Advanced Tutorial 3 (4 q.h.)
See LNI 4815.

LANGUAGE— JAPANESE

LNJ 4101 Elementary Japanese 1 (4 q.h.)

Basic, practical Japanese, emphasizing the essentials of grammar, pronunciation, progressive acquisition of a core vocabulary, and the use of current, idiomatic expressions.

LNJ 4102 Elementary Japanese 2 (4 q.h.)

Continuation of LNJ 4101. Progressive acquisition of practical skills. *Prereq.* LNJ 4101 or equiv.

LNJ 4103 Elementary Japanese 3 (4 q.h.)

Continuation of LNJ 4102. *Prereq.* LNJ 4102.

LNJ 4104 Intermediate Japanese 1 (4 q.h.)

Review of grammar, with practice in composition and conversation. *Prereq.* LNJ 4103 or equiv.

LNJ 4105 Intermediate Japanese 2 (4 q.h.)

History of Japanese civilization, with discussions and conversation. *Prereq.* LNJ 4104 or equiv.

LNJ 4106 Intermediate Japanese 3 (4 q.h.)

Intensive reading of Japanese prose, with practice in conversation. *Prereq.* LNJ 4105 or equiv.

LNJ 4225 Japanese Culture (3 q.h.)
By studying various aspects of Japanese cultural history, education, work-ethics, male-female relations, and other areas, students gain insight into the Japanese mentality and how this homogeneous race is surviving in a heterogeneous world.

LNJ 4815 Japanese Advanced Tutorial 1 (4 q.h.)
Advanced Tutorial Option: When a student is unable to continue study of an upper-level language, or when a

language course needed for a degree is not scheduled at appropriate intervals, arrangements can be made for the student to take three advanced tutorials for a total of twelve quarter hours. See page 21 for details. *Prereq.* 87 q.h.

LNJ 4816 Japanese Advanced Tutorial 2 (4 q.h.)
See LNJ 4815.

LNJ 4817 Japanese Advanced Tutorial 3 (4 q.h.)
See LNJ 4815.

LANGUAGE— LATIN

LNL 4101 Beginning Latin 1 (4 q.h.)
Study of grammar needed for reading elementary Latin prose as well as for understanding some basic etymologies. Recommended for those interested in enriching their knowledge of English and Romance languages and those who want to read classical literature in the original.

LNL 4102 Beginning Latin 2 (4 q.h.)
Continuation of LNL 4101. *Prereq.* LNL 4101.

LNL 4103 Beginning Latin 3 (4 q.h.)
Continuation of LNL 4102. *Prereq.* LNL 4102.

LNL 4815 Latin Advanced Tutorial 1 (4 q.h.)
Advanced Tutorial Option: When a student is unable to continue study of an upper-level language, or when a language course needed for a degree is not scheduled at appropriate intervals, arrangements can be made for the student to take three advanced tutorials for a total of twelve quarter hours. See page 21 for details. *Prereq.* 87 q.h.

LNL 4816 Latin Advanced Tutorial 2 (4 q.h.)
See LNL 4815.

LNL 4817 Latin Advanced Tutorial 3 (4 q.h.)
See LNL 4815.

LANGUAGE— SWEDISH

LNN 4101 Beginning Conversational Swedish 1 (4 q.h.)
Acquisition of basic oral skills by introduction of the essentials of Swedish grammar, with extensive practice in pronunciation and acquisition of an idiomatic core vocabulary.

LNN 4102 Beginning Conversational Swedish 2 (4 q.h.)
Continuation of LNN 4101. Introduces Swedish prose of moderate difficulty. *Prereq.* LNN 4101 or equiv.

LNN 4103 Beginning Conversational Swedish 3 (4 q.h.)
Continuation of LNN 4102. *Prereq.* LNN 4102 or equiv.

LNN 4815 Swedish Advanced Tutorial 1 (4 q.h.)
Advanced Tutorial Option: When a student is unable to continue study of an upper-level language, or when a language course needed for a degree is not scheduled at appropriate intervals, arrangements can be made for the student to take three advanced tutorials for a total of twelve quarter hours. See page 21 for details. *Prereq.* 87 q.h.

LNN 4816 Swedish Advanced Tutorial 2 (4 q.h.)
See LNN 4815.

LNN 4817 Swedish Advanced Tutorial 3 (4 q.h.)
See LNN 4815.

LANGUAGE— RUSSIAN

LNR 4101 Elementary Russian 1 (4 q.h.)
Essentials of grammar, practice in pronunciation, and progressive acquisition of a basic vocabulary and idiomatic expressions.

LNR 4102 Elementary Russian 2 (4 q.h.)
Continuation of grammar study, with oral and written exercises. *Prereq.* LNR 4101 or equiv.

LNR 4103 Elementary Russian 3 (4 q.h.)
Reading of Russian prose of increasing difficulty, with written and oral exercises based on the material read and practice in conversation. *Prereq.* **LNR 4102** or *equiv.*

LNR 4225 Russian Culture and Society (3 q.h.)
Study of various aspects of Russian cultural history, education, work-ethics, male-female relations, and other areas, for insight into the Russian mentality.

LNR 4815 Russian Advanced Tutorial 1 (4 q.h.)
Advanced Tutorial Option: When a student is unable to continue study of an

upper-level language, or when a language course needed for a degree is not scheduled at appropriate intervals, arrangements can be made for the student to take three advanced tutorials for a total of twelve quarter hours. See page 21 for details. *Prereq.* **87 q.h.**

LNR 4816 Russian Advanced Tutorial 2 (4 q.h.)
See LNR 4815.

LNR 4817 Russian Advanced Tutorial 3 (4 q.h.)
See LNR 4815.

LANGUAGE— SPANISH

LNS 4101 Beginning Conversational Spanish 1 (4 q.h.)
Acquisition of basic oral skills by introduction of the essentials of Spanish grammar. Extensive practice in pronunciation and acquisition of an idiomatic core vocabulary.

LNS 4102 Beginning Conversational Spanish 2 (4 q.h.)
Continuation of LNS 4101. Introduces Spanish prose of moderate difficulty. *Prereq.* **LNS 4101** or *equiv.*

LNS 4103 Beginning Conversational Spanish 3 (4 q.h.)
Continuation of LNS 4102. Continued stress on conversation, while building a solid vocabulary. *Prereq.* **LNS 4102** or *equiv.*

LNS 4104 Intermediate Spanish 1 (4 q.h.)
Review of grammar, with practice in composition and conversation. *Prereq.* **LNS 4103** or *equiv.*

LNS 4105 Intermediate Spanish 2 (4 q.h.)
Examination of Spanish civilization through texts of average difficulty. Intensive reading of modern prose, with occasional oral or written translation

and conversation practice based on assigned readings. *Prereq.* **LNS 4104** or *equiv.*

LNS 4106 Intermediate Spanish 3 (4 q.h.)
Examination of Spanish-American civilization through texts of average difficulty. Intensive readings of modern prose, with occasional oral or written translations and conversation practice based on assigned readings. *Prereq.* **LNS 4105** or *equiv.*

LNS 4815 Spanish Advanced Tutorial 1 (4 q.h.)
Advanced Tutorial Option: When a student is unable to continue study of an upper-level language, or when a language course needed for a degree is not scheduled at appropriate intervals, arrangements can be made for the student to take three advanced tutorials for a total of twelve quarter hours. See page 21 for details. *Prereq.* **87 q.h.**

LNS 4816 Spanish Advanced Tutorial 2 (4 q.h.)
See LNS 4815.

LNS 4817 Spanish Advanced Tutorial 3 (4 q.h.)
See LNS 4815.

MANAGEMENT

MGT 4101 Introduction to Business and Management 1 (3 q.h.)

Study of the setting and general structure of American business, including objectives and practices affecting the American standard of living. Examines the characteristics of private enterprise and the nature and challenge of capitalism and other forms of economic enterprise. Introduces types of businesses, the structures of organizations, and the functions of management as well as what a managerial career involves, what problems must be faced, and what decisions must be reached.

MGT 4102 Introduction to Business and Management 2 (3 q.h.)

Methodologies in planning, organizing, directing, and controlling production, marketing, sales, and pricing within the American free enterprise system and in contrast to other business systems. Examines techniques for coping with the intricacies of systems management. *Prereq. MGT 4101.*

MGT 4103 Introduction to Business and Management 3 (3 q.h.)

Basic management concepts and techniques necessary to successful decision making. Emphasizes management as a continuous, active process by introducing methods of designing an organization; understanding and dealing with people; evaluating the political, social, and economic environment; and effectively planning, directing, and controlling an organization. *Prereq. MGT 4102.*

MGT 4105 Introduction to Business and Management (Intensive) (6 q.h.)

Same as MGT 4101 and MGT 4102.

MGT 4109 Women in Business Organizations: Leadership and Communications (formerly INT 4103) (3 q.h.)

Study of dynamics of leadership as they relate to the successful woman manager, including managing conflict, securing control, instituting change, motivating and disciplining others, gaining respect, communicating and distinguishing supervisory from management performance standards.

Role playing and case studies assist in the development of leadership and problem-solving capabilities.

MGT 4110 Survey of Business and Management (4 q.h.)

Introduction to the setting and general structure of American business, the characteristics of private enterprise, and the nature and challenge of capitalism and other forms of economic enterprise. Covers the forms of business, organizational structure, and functions of management. Through lectures and class discussion, students are given an overview of the methodologies used in planning, organizing, directing, and controlling the functions of production, marketing, sales, pricing, and finance. *For Alternative Freshman-Year students only.*

MGT 4120 Management of Nonprofit Organizations (3 q.h.)

Nonprofit organizations are found in many areas: medicine, education, human services, arts, religion, and professional associations. This course examines the scope and environment of the nonprofit segment of our economy and investigates characteristics related to governance, membership, organizational structure, financial management, and operational techniques. Special emphasis is placed on business/management needs and professional skills for those interested in or affiliated with nonprofit organizations.

MGT 4320 Managing Change (3 q.h.)

Application of managerial concepts and practices to real-world situations with policy or resource constraints. Explores decision making related to the impact of change on the organization and its personnel: develops a conceptual framework for handling change in one's own business career. *Prereq. MGT 4102.*

MGT 4321 Managing for Results (formerly IM 4320, Managing for Results) (3 q.h.)

A forum for the discussion of the wide-ranging management theories of Peter Drucker and other managerial theorists. Covers the concepts and

methods available to the results-oriented manager and relationships between theory, practice, and implementing for results. *Prereq.* MGT 4102.

MGT 4323 Management and Leadership (formerly Motivation Management) (3 q.h.)

Designed to help students differentiate between the managerial position as such and a leadership role, evaluating the impact of leadership and management styles on human behavior. Introduces and analyzes important motivation concepts through study of the working environment and the processes that influence both performance and outcome. *Prereq.* MGT 4102.

MGT 4328 Creating New Ventures (3 q.h.)

The nature of entrepreneurship and potential for self-employment by the individual. Includes the sequence from generation of an idea through the design of a plan for owning and operating a small business. *Prereq.* MGT 4102.

MGT 4329 Managing Small Businesses (3 q.h.)

Study of managerial operations of a small business. Presents issues and problems encountered by those considering entrepreneurial and small business endeavors, including the facets of financing, planning, market research, and strategy for small businesses. *Prereq.* MGT 4102.

MGT 4330 Essentials for Managers of Small Businesses (3 q.h.)

Designed for small business entrepreneurs or persons interested in running a small business. Covers fundamental business concepts, including ownership forms; ongoing market research, capitalization, and management and operating issues; personnel and benefits; risk management; tax considerations; operating finances; and small business strategic positioning. Generally offered in six half-day sessions.

MGT 4340 Small Business 1 (3 q.h.)

Development and completion of a full business plan for entrepreneurs or persons interested in operating a small

business. Covers the nature and characteristics of entrepreneurship; personal analysis; generation of ideas and market identification; legal and tax ramifications of ownership forms; marketing research and planning. Optional Lotus 1-2-3 seminar. (MIS 4123).

MGT 4341 Small Business 2 (3 q.h.)

The marketing research and development of the marketing plan portion of the overall business plan. Topics include new business capital requirements, including the differences in venture and equity funding; and developing the financial management plan portion of the overall business plan, along with business strategy implications, personnel matters, and the use of computers. *Prereq.* MGT 4340.

MGT 4346 International Business Management and Operations (Open) (3 q.h.)

Principles and practices of international business, comparing domestic and international business activities, responsibilities, and influences. Explores the economic, social, political, and legal contexts of conducting business in a multinational environment and examines how the "foreign" factor in the business equation influences behavior. *Prereq.* MGT 4102.

MGT 4355 Manager and Society (Open) (3 q.h.)

For managers, potential managers, and others interested in the national and international issues confronting business and industry in their relationships with governments, societies, and individuals. Includes issues of changing work environments and the variety of influences and pressures that need to be taken into account when making socially responsible business decisions. *Prereq.* MGT 4102.

MGT 4357 Cultural Issues in International Business (3 q.h.)

When a U.S. company opens an office in a foreign land, cultural clashes may occur. How does management cope and help its employees to cope with these differences? This course examines the problems of doing business in another country, including third-world countries.

MGT 4358 Contemporary Management Issues
(3 q.h.)

Study business and management issues affecting today's management decisions. Includes changes in our economic system and the economy; corporate culture; social responsibility; ethics; worker's needs, motivation, and satisfaction; demographics; and management-labor interactions.

Prereq. MGT 4102.

MGT 4410 Project Management Process: Planning and Implementation (Reserved)

(formerly Project Planning and Control) (3 q.h.)

The entire process of implementing a project, from project definition to the evaluation of feasibility, scheduling, and financial and budgetary factors. Management techniques and requirements are used in case analyses, along with the concept of using computer software to help oversee projects.

Prereq. IM 4401 or IM 4301 and 80 q.h.

MGT 4446 International Business Management and Operations (Reserved)

(3 q.h.)

Principles and practices of international business, comparing domestic and international business activities, responsibilities, and influences. Explores the economic, social, political, and legal contexts of conducting business in a multinational environment and examines how the "foreign" factor in the business equation influences behavior. *Prereq.* MGT 4302.

MGT 4450 Business Policy 1 (Reserved)

(3 q.h.)

For advanced students building on all previous management courses and on numerous functional and procedural courses. Examines the total management process for formulating business strategy. Covers the development of corporate objectives, plans, and policies, emphasizing the interaction between the enterprise and its environment. The economic and social responsibilities of business and managers are also considered. *Prereq.* 100 q.h. and completion of all core courses in business.

MGT 4451 Business Policy 2 (Reserved)

(3 q.h.)

Study of organizational and administrative methods for converting plans into achievements. Explores concepts of strategic planning and implementation from the perspective of the general manager, with attention to top management functions, responsibilities, styles, values, and organizational relationships. Includes cases from profit and nonprofit enterprises of various types. *Prereq.* MGT 4450.

MGT 4452 Business Policy (Reserved)

(Intensive) (6 q.h.)

Same as MGT 4450 and MGT 4451.

Prereq. 100 q.h.

MGT 4455 Manager and Society (Reserved)

(3 q.h.)

For managers, potential managers, and others interested in the national and international issues confronting business and industry in their relationships with governments, societies, and individuals. Includes issues of changing work environments and the variety of influences and pressures that need to be taken into account when making socially responsible business decisions. *Prereq.* MGT 4302.

MGT 4460 Management Seminar 1

(Reserved) (3 q.h.)

Capstone course requiring individual and/or group investigation and analysis of a substantive management issue. Projects should involve broad, interdisciplinary knowledge and experience, use a variety of research techniques, and be original in analysis and conclusions. Topics to be selected with the advice and approval of the instructor. *Prereq.* 100 q.h. and completion of all core courses in business.

MGT 4461 Management Seminar 2

(Reserved) (3 q.h.)

Continuation of MGT 4460. *Prereq.* MGT 4460.

MGT 4463 Management Seminar (Intensive)

(6 q.h.)

Sames as MGT 4460 and MGT 4461. *Prereq.* MGT 4460.

MANAGEMENT INFORMATION SYSTEMS

MGT 4600 Honors Program 1 (4 q.h.)
Opportunity to undertake an in-depth research study project. See page 21 for details. *Prereq.* 96 q.h., 3.5 q.p.a.

MGT 4601 Honors Program 2 (4 q.h.)
See MGT 4600.

MGT 4602 Honors Program 3 (4 q.h.)
See MGT 4600.

MGT 4701 Independent Study 1 (3 q.h.)
Opportunity to undertake special research. See page 21 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

MGT 4702 Independent Study 2 (3 q.h.)
See MGT 4701.

MIS 4101 Introduction to Data Processing and Information Systems 1 (3 q.h.)
Introduction to data processing and computers, including an overview of data processing history, business data processing concepts, data processing organization, computer hardware, the internal representation of data, and data communication concepts. In-class demonstration of DOS, wordprocessing, and spreadsheets. Computer labs for students' completion of projects available at Belmont, Boston, Burlington, Dedham, Framingham, and Liberty Square. Students may also complete projects on any computer available to them.

MIS 4102 Introduction to Data Processing and Information Systems 2 (3 q.h.)
Continuation of MIS 4101. Concentrates on software and systems. Includes the systems-development life cycle, programming tools and program preparation, the use of computers for specific business applications, database management systems, and high-level programming and planning languages. Class consists of in-class demonstration by instructor on

MGT 4703 Independent Study 3 (3 q.h.)
See MGT 4701.

MGT 4800 Advanced Tutorial 1 (3 q.h.)
Opportunity to take upper level course independently. See page 21 for details. *Prereq.* 87 q.h.

MGT 4801 Advanced Tutorial 2 (3 q.h.)
See MGT 4800.

MGT 4900 Field Work (6 q.h.)
Opportunity to enhance career development by applying academic background to practical problems in the workplace. See page 21 for details. *Prereq.* Approval of Program Director.

database software. Computer labs for students' completion of projects available at Belmont, Boston, Burlington, Dedham, Framingham, and Liberty Square. Students may also complete projects on any computer available to them. *Prereq.* MIS 4101.

MIS 4103 Introduction to Data Processing and Information Systems (Intensive) (6 q.h.)
Same as MIS 4101 and MIS 4102.

MIS 4123 Lotus 1-2-3 (3 q.h.)
For business and management students enrolled in certain University College courses. Designed to acquaint students with Lotus 1-2-3 for use in their course activities. Scheduled for four hours on two consecutive Saturdays.

MIS 4220 Introduction to Programming in COBOL (3 q.h.)
Fundamentals of computer programming, along with COBOL (Common Business Oriented Language) and its divisions, data file structures, and verb actions. Students prepare and test several programs using the University computer system. *Prereq.* MIS 4102 or MIS 4103.

MIS 4221 COBOL Programming 1 (3 q.h.)
Beginning computer problem solving and programming using COBOL. Includes structured flow-charting and programming techniques, use of an editor for program generation, input/output record layouts, and basic concepts, such as COBOL divisions and verbs. Students prepare and test several programs using the University computer system. *Prereq. MIS 4102 or MIS 4103.*

MIS 4222 COBOL Programming 2 (3 q.h.)
Continuation of MIS 4221. Includes logical control breaks, creation of multipage reports, sign and class tests, verification of input data, and table handling (subscripting and indexing). Students prepare and test several programs using the University computer system. *Prereq. MIS 4221.*

MIS 4223 COBOL Programming 3 (3 q.h.)
Continuation of MIS 4222. Includes advanced programming techniques, such as the internal sort facility and indexed file processing. Students prepare and test several programs using the University computer system. *Prereq. MIS 4222.*

MIS 4225 COBOL Programming (Intensive) (9 q.h.)
Same as MIS 4221, MIS 4222, and MIS 4223. *Prereq. MIS 4102 or MIS 4103.*

MIS 4230 PC Software for Professionals (formerly End User Software) (3 q.h.)
Study of the large and rapidly growing collection of software geared toward the needs of the nontechnical end user. Includes discussion of various software packages such as spreadsheets, databases, and graphics.

MIS 4235 Advanced COBOL Programming (3 q.h.)
Several kinds of programming disciplines for the COBOL programmer. Techniques include STRING and UNSTRING; CALL subroutines; table handling with one, two, and three dimensions; Indexed Sequential Access Method (ISAM) processing; DEBUG; communications; and copy. *Prereq. MIS 4223 or MIS 4225.*

MIS 4236 Advanced PC Software (3 q.h.)
Advanced skills in spreadsheets, graphics, database, and advanced commands in PC/MS-DOS. Includes lectures, in-class demonstrations, and extensive assignments that apply skills. Not for the first-time personal computer user. *Prereq. MIS 4230 or equiv.*

MIS 4241 Programming in BASIC 1 (3 q.h.)
Introduction to computer programming using BASIC. Includes arithmetic operators, variables, expressions, arrays, functions, and formatted printing. Students write, debug, and run a number of programs on the computer. *Prereq. MIS 4102.*

MIS 4242 Programming in BASIC 2 (3 q.h.)
Continuation of MIS 4241. Covers more sophisticated BASIC programming techniques. Includes subroutines, nested loops, sorting, and file handling. Students write, debug, and run a number of programs on the computer. *Prereq. MIS 4240 or MIS 4241.*

MIS 4250 FORTRAN Programming 1 (3 q.h.)
Introduction to computer programming using FORTRAN, a high-level language used primarily in scientific applications. Includes variables, constants, expressions, arithmetic operations, and looping. Students write, debug, and run a number of programs on the computer. *Prereq. MIS 4102.*

MIS 4251 FORTRAN Programming 2 (3 q.h.)
Continuation of MIS 4250. Covers more complex FORTRAN programming. Includes arrays, functions, and subroutines. Students write, debug, and run a number of programs on the computer. *Prereq. MIS 4250.*

MIS 4252 FORTRAN Programming 3 (3 q.h.)
Continuation of MIS 4251. Emphasizes applications and case studies. Students write a series of programs for scientific and business problems to gain proficiency in the FORTRAN language. Typical topics include simulation, sorting and merging, plotting, and financial analysis. Students write, debug, and run a number of programs on the computer. *Prereq. MIS 4251.*

MIS 4253 FORTRAN Programming (Intensive) (9 q.h.)

Same as MIS 4250, MIS 4251, and MIS 4252. *Prereq.* MIS 4102.

MIS 4260 Assembly Programming 1 (3 q.h.)

Introduction to the VAX-11 Assembler running under the VMS operating system. Includes the binary representation of instructions and data, looping, instruction modification, indexing, indirect addressing, and data retrieval. Includes a brief survey of Assembly languages in general. *Prereq.* demonstrated familiarity with any currently available computer language.

MIS 4261 Assembly Programming 2 (3 q.h.)

Continuation of MIS 4260. Includes addressing structures, floating-point techniques, coding, use of macro instructions, input-output routines, use of the operating system for job scheduling resource allocation, and file handling. *Prereq.* MIS 4260.

MIS 4262 Assembly Programming 3 (3 q.h.)

Continuation of MIS 4261. Includes advanced use of the operating system, device-independent file handling, and blocked and unblocked file manipulation. *Prereq.* MIS 4261.

MIS 4263 Assembly Programming Intensive (6 q.h.)

Same as MIS 4261 and MIS 4262. *Prereq.* demonstrated familiarity with any currently available computer language.

MIS 4270 Pascal Programming 1 (3 q.h.)

Introduction to computer programming using the Pascal language. Includes arrays of records, text files, record files, and procedures and functions. Students write, debug, and run a number of programs on the computer. *Prereq.* MIS 4102.

MIS 4271 Pascal Programming 2 (3 q.h.)

Continuation of MIS 4270. Covers more sophisticated Pascal features. Includes multidimensional arrays, recursion, file sorting and merging techniques, sets, and structures. Students write, debug, and run a number of programs on the computer. *Prereq.* MIS 4270.

MIS 4273 PC DOS (3 q.h.)

Introduction to the Disk Operating

System (DOS), a collection of programs that manages the activities among personal computer components. Students have the opportunity to write one or more DOS batch routines.

Prereq. MIS 4102.

MIS 4276 Programming in C 1 (3 q.h.)

Fundamentals of the C programming language, I/O operations, arithmetic operations, loops, arrays, character strings, functions. Structures, file organization (textfiles, random access files). Pointers, queues, stacks, rings, binary trees. *Prereq.* Knowledge of at least one other programming language.

MIS 4277 Programming in C 2 (3 q.h.)

Advanced programming techniques using C, recursion, address arithmetic, the preprocessor, pointers vs. multidimensional arrays, pointers to functions, macros, nested structures, unions, file merging and sorting techniques, linked lists, command line arguments, binary trees, operations on bits, enumerated data types. *Prereq.* MIS 4276.

MIS 4280 Computer Operating Systems 1 (3 q.h.)

Intended for those familiar with data processing and interested in developing, evaluating, and using systems programs. Examines the full range of features available in a variety of computer operating systems in terms of structure and form. Compares operating systems implementation techniques employed by different computer manufacturers, with emphasis on their value as tools for application program development. Refers generally to IBM operating systems, but also to other manufacturers, including Digital and Data General. *Prereq.* MIS 4220 or MIS 4221.

MIS 4281 Computer Operating Systems 2 (3 q.h.)

Building on concepts and techniques presented in MIS 4280, introduces distributed systems and networking software, a variety of data-base systems, and the UNIX operating system. Includes discussions of local

and wide-area networking systems and operating systems features. Expands data management as an operating systems feature to include data-base systems available from various computer manufacturers and software suppliers. *Prereq.* MIS 4280.

MIS 4301 Structured Systems Analysis and Design 1 (Open) (3 q.h.)

Systems analysis and design cycle, with emphasis on the analysis phase. Includes the history and life-cycle of business information systems, the role of the systems analyst, analytical tools useful to the systems study process, development of feasibility studies, and presentation of study phase findings. *Prereq.* MIS 4102.

MIS 4302 Structured Systems Analysis and Design 2 (Open) (3 q.h.)

Continuation of MIS 4301. Emphasizes the design phase and systems implementation. Includes detailed systems design procedures and techniques, system testing, specification and procedure writing, documentation, design of auditing and control procedures, performance measurement techniques, hardware and software selection and planning, and project management. *Prereq.* MIS 4301 or MIS 4401.

MIS 4305 Structured Systems Analysis and Design (Intensive) (Open) (6 q.h.)

Same as MIS 4301 and MIS 4302.

MIS 4307 Communications and Networking (Open) (3 q.h.)

Communications, networking, and distributed processing from the user's rather than the designer's point of view. Includes the economics of distributed processing, communications concepts, local-area networks, and vendor selection. *Prereq.* MIS 4302 or MIS 4402.

MIS 4350 Auditing Data Processing (3 q.h.)

EDP audit techniques, programming, and operations, emphasizing EDP standard practices, procedures, documentation, and safety and security. Defines EDP business risks and related exposures, such as fraud, embezzlement, misuse or destruction of company assets, and business inter-

ruption. Offers discussion of the EDP portion of accounting requirements of the Foreign Corrupt Practices Act of 1977. Course content is oriented toward EDP managers, internal auditors, and public accountants. *Prereq.* MIS 4102.

MIS 4360 Computer Privacy and Security (3 q.h.)

Threats posed by and to modern electronic computers and their users. Includes a review of the issue of privacy and approaches, techniques, and tools used to safeguard computers. Uses actual case studies of computer abuse. *Prereq.* MIS 4102.

MIS 4401 Structured Systems Analysis and Design 1 (Reserved) (3 q.h.)

Systems analysis and design cycle, with emphasis on the analysis phase. Includes the history and life-cycle of business information systems, the role of the systems analyst, analytical tools useful to the systems study process, development of feasibility studies, and presentation of study phase findings. *Prereq.* MIS 4102 and 80 q.h.

MIS 4402 Structured Systems Analysis and Design 2 (Reserved) (3 q.h.)

Continuation of MIS 4401. Emphasizes the design phase and systems implementation. Includes detailed systems design procedures and techniques, system testing, specification and procedure writing, documentation, design of auditing and control procedures, performance measurement techniques, hardware and software selection and planning, and project management. *Prereq.* MIS 4401 or MIS 4301 and 80 q.h.

MIS 4405 Structured Systems Analysis and Design (Reserved) (Intensive) (6 q.h.)

Same as MIS 4401 and MIS 4402.

MIS 4407 Communications and Networking (Reserved) (3 q.h.)

Communications, networking, and distributed processing from the user's rather than the designer's point of view. Includes the economics of distributed processing, communications concepts, local-area networks, and vendor selection. *Prereq.* MIS 4402 or MIS 4302 and 80 q.h.

MIS 4445 DataBase Management Systems (Reserved) (3 q.h.)

Introduction to the database approach to design of integrated information applications. Covers the three methods of database design; data structures; diagramming; data definition languages; data manipulation languages; database implementation and evaluation; and the role of the database administrator. *Prereq. MIS 4222, MIS 4230, and MIS 4302 and 80 q.h. or MIS 4402.*

MIS 4448 Information Resource Management (Reserved) (3 q.h.)

Advanced information systems management, emphasizing planning, organizing, and controlling the corporate information resource. Includes personnel career planning, turnover, facilities and capacity planning, turnover, facilities and capacity planning, the user interface, standards development, RFP generation and vendor selection, hardware and software conversion problems, and disaster recovery. *Prereq. MIS 4445.*

MIS 4485 Applied MIS Development Project (Reserved) (3 q.h.)

Capstone systems course integrates knowledge and abilities gained through other computer-related courses in the curriculum, within a comprehensive systems development project. The student has a choice of two options. Option I is a systems analysis and system design of a small system which is usually personal computer based. This includes the topics covered in MIS 4401 and MIS 4402 and requires

the programming of two or three programs from the system designed. The final product is a complete system with operational programs. Option II is a detailed research project. The topic is selected by the student, approved and the scope defined by the instructor. The final product is a paper which covers the selected topic from various viewpoints. *Prereq. MIS 4448.*

MIS 4600 Honors Program 1 (4 q.h.)

Opportunity to undertake an in-depth research study project. See page 21 for details. *Prereq. 96 q.h., 3.5 q.p.a.*

MIS 4601 Honors Program 2 (4 q.h.)

See MIS 4600.

MIS 4602 Honors Program 3 (4 q.h.)

See MIS 4600.

MIS 4701 Independent Study 1 (3 q.h.)

Opportunity to undertake special research. See page 21 for details. *Prereq. 96 q.h., 3.0 q.p.a.*

MIS 4702 Independent Study 2 (3 q.h.)

See MIS 4701.

MIS 4703 Independent Study 3 (3 q.h.)

See MIS 4701.

MIS 4800 Advanced Tutorial 1 (3 q.h.)

Opportunity to take upper-level course independently. See page 21 for details. *Prereq. 87 q.h.*

MIS 4801 Advanced Tutorial 2 (3 q.h.)

See MIS 4800.

MIS 4900 Field Work (6 q.h.)

Opportunity to enhance career development by applying academic background to practical problems in the workplace. See page 21 for details. *Prereq. Approval of Program Director.*

MARKETING

MKT 4301 Introduction to Marketing 1 (Open) (3 q.h.)

This course consists of lectures, readings and small group discussions on the role of marketing in contemporary society, in the business enterprise, and in the nonprofit organization. Consideration is given to the planning, operation, and evaluation of marketing and promotional efforts necessary to the effective marketing of consumer and industrial products and services in both profit and nonprofit organizations.

MKT 4302 Introduction to Marketing 2 (Open) (3 q.h.)

Continuation of MKT 4301. Develops the link between marketing theory and practice. Covers specific marketing issues and problems. Includes case study analysis and current marketing issues. *Prereq. MKT 4401 or MKT 4301 and 80 q.h.*

MKT 4304 Introduction to Marketing (Intensive) (Open) (6 q.h.)

Same as MKT 4301 and MKT 4302.

MKT 4307 Telemarketing Management
(3 q.h.)

The place of telemarketing in the marketing program. Key concepts of telemarketing in the advertising, sales promotion, market research, and selling process.

MKT 4310 Advertising Management 1 (Open)
(3 q.h.)

This course focuses on the management of the advertising function in relation to a firm's overall marketing objectives. The course approaches the subject from the perspective of the user of advertising (e.g., product manager, marketing manager). Case studies and text material are used to help the student develop decision-making skills. *Prereq. MKT 4420 or MKT 4320.*

MKT 4315 Sales Management 1 (Open)
(3 q.h.)

Allows student to develop effective selling skills. Examines the customer buying process and the company sales process. Discusses prospecting, preparation, presentation, and post-sale activities and introduces advanced selling techniques, such as team selling. Focuses on situations where personal selling is a major element of marketing strategy, such as industrial-product, professional-service, and high-technology marketing. *Prereq. MKT 4420 or MKT 4320 and 80 q.h.*

MKT 4320 Marketing Management (Open)
(3 q.h.)

This course is designed to provide training in marketing decision making. Case studies simulating actual business settings are used to help students develop analytical abilities and sharpen their communication skills. Topics covered ranged from techniques used to analyze a market to the development of a total marketing strategy (product policy, pricing policy, promotion policy, and distribution policy). *Prereq. MKT 4401 or MKT 4301.*

MKT 4330 Marketing Research 1 (Open) (3 q.h.)

Use of marketing research in planning and evaluating marketing activities and in formulating marketing decisions. Introduces marketing information systems, primary and secondary,

quantitative and qualitative research, use of market research for demand measurement and forecasting, product research, advertising research, and test marketing. Course is taught from the viewpoint of the user of marketing research. *Prereq. MKT 4420 or MKT 4320.*

MKT 4335 Public Relations 1 (3 q.h.)

Introduction to the basic principles, purposes, and practices of public relations in both commercial and nonprofit organizations. Emphasizes organization, research, and writing fundamentals.

MKT 4336 Public Relations 2 (3 q.h.)

Continuation of MKT 4335. Emphasizes the development of public relations programs for specific publics. *Prereq. MKT 4335.*

MKT 4337 Advertising and Promotion (3 q.h.)

For nonbusiness majors. Focuses on advertising, sales promotion, public relations, publicity, and personal selling as important elements in the marketing process. Also examines the ethical, social, and economic aspects of advertising and promotion.

MKT 4340 Retail Management 1 (3 q.h.)

Concepts and techniques of store operations and merchandise management. Focuses on the activities and contributions of various retailing institutions, such as independents, chains, dealerships, specialty stores, supermarkets, discount stores, and franchises. Also includes retail management, retail profit and loss, starting a retail business, store location, store planning, and the retail organization. *Prereq. MKT 4301.*

MKT 4341 Retail Management 2 (3 q.h.)

Continuation of MKT 4340. Emphasizes store operations; merchandising planning, control, and management; pricing; buying; sales promotion; customer service; retail accounting; and expense management. *Prereq. MKT 4340.*

MKT 4401 Introduction to Marketing 1 (Reserved) (3 q.h.)

This course consists of lectures, readings and small group discussions on the role of marketing in contem-

porary society, in the business enterprise, and in the nonprofit organization. Consideration is given to the planning, operation, and evaluation of marketing and promotional efforts necessary to the effective marketing of consumer and industrial products and services in both profit and nonprofit organizations. *Prereq.* 80 q.h.

MKT 4402 Introduction to Marketing 2 (Reserved) (3 q.h.)

Continuation of MKT 4401. Develops the link between marketing theory and practice. Covers specific marketing issues and problems. Includes case study analysis and current marketing issues. *Prereq.* MKT 4401 or MKT 4301 and 80 q.h.

MKT 4404 Introduction to Marketing (Intensive) (Reserved) (6 q.h.)

Same as MKT 4401 and MKT 4402.

MKT 4410 Advertising Management 1 (Reserved) (3 q.h.)

This course focuses on the management of the advertising function in relation to a firm's overall marketing objectives. The course approaches the subject from the perspective of the user of advertising (e.g., product manager, marketing manager). Case studies and text material are used to help the student develop decision-making skills. *Prereq.* MKT 4420 or MKT 4320 and 80 q.h.

MKT 4411 Advertising Management 2 (Reserved) (3 q.h.)

Continuation of MKT 4410. Surveys why and how advertising works, and includes challenging and practical case studies. *Prereq.* MKT 4420 or MKT 4320 and 80 q.h.

MKT 4412 Advertising Management (Reserved) (Intensive) (6 q.h.)

Same as MKT 4410 and MKT 4411. *Prereq.* MKT 4420 or MKT 4320 and 80 q.h.

MKT 4415 Sales Management 1 (Reserved) (3 q.h.)

Allows student to develop effective selling skills. Examines the customer buying process and the company sales process. Discusses prospecting, preparation, presentation, and post-sale activities and introduces advanced

selling techniques, such as team selling. Focuses on situations where personal selling is a major element of marketing strategy, such as industrial-product, professional-service, and high-technology marketing. *Prereq.* MKT 4420 or MKT 4320 and 80 q.h.

MKT 4416 Sales Management 2 (Reserved) (3 q.h.)

This course is designed to help the student develop decision-making skills necessary for both building and maintaining an effective sales organization. Cases and readings are used to examine the strategic and operating problems of the sales manager. Major topic areas include the selling function, sales management at the field level, and the sales executive. *Prereq.* MKT 4415 or MKT 4315 and 80 q.h.

MKT 4417 Sales Management (Reserved) (Intensive) (6 q.h.)

Same as MKT 4415 and MKT 4416. *Prereq.* MKT 4420 or MKT 4320 and 80 q.h.

MKT 4420 Marketing Management (Reserved) (3 q.h.)

This course is designed to provide training in marketing decision making. Case studies simulating actual business settings are used to help students develop analytical abilities and sharpen their communications skills. Topics covered range from techniques used to analyze a market to the development of a total marketing strategy (product policy, pricing policy, promotion policy, and distribution policy). *Prereq.* MKT 4401 or MKT 4301 and 80 q.h.

MKT 4430 Marketing Research 1 (Reserved) (3 q.h.)

Use of marketing research in planning and evaluating marketing activities and in formulating marketing decisions. Introduces marketing information systems, primary and secondary, quantitative and qualitative research use of market research for demand measurement and forecasting, product research, advertising research, and test marketing. Course is taught from the viewpoint of the user of marketing research. *Prereq.* MKT 4420 or MKT 4320 and 80 q.h.

MKT 4431 Marketing Research 2 (Reserved)
(3 q.h.)

Course focuses on the techniques and procedures required to conduct high quality research studies. Topics include problem definition, exploratory research, research design, sampling techniques, questionnaire development, data collection methods, survey errors, and processing and analyzing research data. Course is taught from the viewpoint of the person who conducts market research studies. *Prereq.* **MKT 4430 or MKT 4330 and 80 q.h.**

MKT 4453 International Marketing (Reserved) (3 q.h.)

This course is designed to help familiarize the student with those aspects of marketing that are unique to international business within the framework of traditional functional areas of marketing. The focus is on the environment and the modifications of marketing concepts and practices necessitated by environmental differences. Topics include cultural dynamics in international markets, political and legal environmental constraints, educational and economic constraints, international marketing research, international marketing institutions, and marketing practices abroad. *Prereq.* **MKT 4420 or MKT 4320 and 80 q.h.**

MKT 4457 Competitive Strategy (Reserved)
(3 q.h.)

A capstone marketing course, required of all students with a marketing

concentration. The focus is on the formulation of marketing strategy at a policy level and its implementation in a dynamic environment. *Prereq.* **MKT 4420 or MKT 4320 and 80 q.h.**

MKT 4600 Honors Program 1 (4 q.h.)

Opportunity to undertake an in-depth research study project. See page 21 for details. *Prereq.* 96 q.h., 3.5 q.p.a.

MKT 4601 Honors Program 2 (4 q.h.)

See MKT 4600.

MKT 4602 Honors Program 3 (4 q.h.)

See MKT 4600.

MKT 4701 Independent Study 1 (3 q.h.)

Opportunity to undertake special research. See page 21 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

MKT 4702 Independent Study 2 (3 q.h.)

See MKT 4701.

MKT 4703 Independent Study 3 (3 q.h.)

See MKT 4701.

MKT 4800 Advanced Tutorial 1 (3 q.h.)

Opportunity to take upper-level course independently. See page 21 for details. *Prereq.* 87 q.h.

MKT 4801 Advanced Tutorial 2 (3 q.h.)

See MKT 4800.

MKT 4900 Field Work (6 q.h.)

Opportunity to enhance career development by applying academic background to practical problems in the workplace. See page 21 for details. *Prereq.* Approval of Program Director.

**MEDICAL
LABORATORY
SCIENCE**

MLS Courses at Special Tuition Rate

Course descriptions for medical laboratory science courses numbered MLS 1XXX are available from the College of Pharmacy and Allied Health Professions, 206 Mugar Building. Call 617-437-3664.

MLS 4104 Introduction to Phlebotomy
(4 q.h.)

This course emphasizes the role of the phlebotomist as part of the health care team. Topics will include proper patient identification, patient relationship, equipment, venipuncture procedure, anatomy and physiology, terminology and pertinent others.

MLS 4108 Phlebotomy Applied Study (2 q.h.)

This course develops the confidence and experience needed to become an expert phlebotomist. Varieties of venipunctures will be performed under the supervision of clinical instructors in an affiliated clinical site. *Prereq.* **MLS 4104.**

MLS 4301 Medical Laboratory Science Orientation (2 q.h.)

Scope, responsibilities, opportunities, and educational requirements for the medical laboratory science professions. Medical terminology and laboratory mathematics are included.

MLS 4321 Hematology* (3 q.h.)

Basic hematological techniques, including discussion of the differential smear and observation of the normal morphology of human red cells, white cells, and platelets. (Laboratory fee.) *Prereq.* BIO 4104 or equiv. Not open to medical technology majors.

MLS 4322 Morphologic Hematology 1† (3 q.h.)

Morphologic and etiologic classification of the anemias. Related diagnostic tests are discussed. (Laboratory fee.) *Prereq.* MLS 4321 or equiv.

MLS 4323 Morphologic Hematology 2† (3 q.h.)

Studies of pathologic and physiologic deviations of the white cells series as observed in leukemias and infections. Some animal hematology is included. (Laboratory fee.) *Prereq.* MLS 4322 or equiv.

MLS 4341 Epidemiology 1 (3 q.h.)

Basic concepts in epidemiology, the distribution in determinants of diseases and injuries in human populations. Descriptive and analytical epidemiology studies are included.

MLS 4342 Epidemiology 2 (3 q.h.)

Microbiological distributions in determinants of infectious diseases; hospital epidemiology. May be taken independently of Epidemiology 1.

**MANAGEMENT
SCIENCE****MS 4325 Business Decision Models**

(Formerly Introduction to Modeling and Simulation) (3 q.h.)

Modeling as a method for gaining insight into the underlying mathematical structure of business problems. Discusses specific modeling techniques, such as linear programming and simulation. *Prereq.* MTH 4111 and ECN 4251.

MS 4332 Statistical Quality Control (3 q.h.)

Practical course in analytical methods in quality control. The application of basic statistical controls in the industrial and service sectors. Includes control charts, statistical tolerancing, acceptance sampling techniques, life testing, and reliability concepts. *Prereq.* ECN 4251.

MLS 4352 Basic MLS Electronics and Instrumentation (2 q.h.)

Electricity, with coverage of introductory electronic circuits. Emphasizes medical laboratory instrumentation and related electrical processes of measurement.

MLS 4365 Quality Control (3 q.h.)

Development of quality control programs in each medical laboratory specialty. Includes applications of statistical methods to medical laboratory quality control programs.

MLS 4381 Seminar in Medical Technology (3 q.h.)

Current topics in medical technology. Includes required readings and presentations by students; guest lecturers. *Prereq.* instructor's permission.

MLS 4700 Advanced Tutorial 1 (3 q.h.)

Opportunity to take upper-level course independently. See page 21 for details. *Prereq.* 87 q.h.

MLS 4701 Advanced Tutorial 2 (3 q.h.)

See MLS 4700.

*Offered even numbered academic years.

†Follows MLS 4321 in Winter and Spring quarters respectively.

MS 4333 Management of Quality Control (3 q.h.)

Management practices of modern quality control and the different approaches to optimizing quality. Includes organizational strategies, economics of quality, internal and external quality, and management of long-term quality and reliability. *Prereq.* MS 4332.

MS 4334 Advanced Quality Control (3 q.h.)

Quality control topics of current interest. Typical subjects include Asian quality methods, advanced process capability techniques, use of computers in quality control, and integration of quality and reliability programs.

MS 4335 Principles of Material Inspection (3 q.h.)

Bridges the gap between manufacturing and data analysis, with emphasis on the measuring process. In-class labs provide hands-on training in the use of a wide variety of mechanical measuring devices. Lectures demonstrate the fundamental measuring principles involved and illustrate their extension to all measuring processes.

MS 4336 Industrial Experimentation (3 q.h.)

Practical techniques for data collection that can greatly extend students' problem-solving skills. Includes instruction in extracting maximum

information from small samples and avoiding many common data-analysis pitfalls. Other topics include randomized tests, multi-level tests, two-level multi-factor tests, and Taguchi methods. *Prereq.* ECN 4251 or equiv.

MS 4337 Principles of Quality Assurance (3 q.h.)

The modern quality function from its beginnings in product design to vendor selection, incoming inspection, monitoring of the manufacturing process, final product testing, and customer acceptance. Includes defining quality, quality organization, sampling plans, control charts, and quality assurance reporting.

MATH

MTH 4100 Conquering Math 1 (Noncredit)

Designed for those persons with anxiety about using math, or who have had minimal exposure to it. The course begins with an explanation of numbers and arithmetic operations. It concludes with the arithmetic manipulation of numbers, such as: slope, averages, and percents. Word problems are used throughout the course. Upon successful completion of the course, the student will be prepared to take applicable college credit mathematics courses.

MTH 4101 Conquering Math 2 (Noncredit)

A continuation of Conquering Math 1.

MTH 4001 Introduction to Mathematics 1

(3 q.h.)

Review of elementary algebra, including operations on integers, algebraic expressions, exponents, equations, word problems, and graphing. *Credit for this course cannot be applied to School of Engineering Technology degree programs.*

MTH 4002 Introduction to Mathematics 2

(3 q.h.)

Further review of mathematics, including operations with polynomials, factoring, fractional expressions, and radicals. *Credit for this course cannot be applied to School of Engineering Technology degree programs. Prereq.* MTH 4001.

MTH 4006 Technical Mathematics* (4 q.h.)

Reviews high school algebra equations, formulas, exponents, polynomials,

factoring, scientific notation, fractions, radicals, complex numbers, quadratic equations, and linear equations. (Credit cannot be used in the associate in engineering, associate in science, or the bachelor of engineering technology degree programs.)

MTH 4107 College Algebra* (4 q.h.)

Diagnostic exam to insure proper placement of students. Interval notation, integer and rational exponents, factoring, operations with fractional expressions, operations with radicals and complex numbers, Pythagorean theorem, linear and quadratic equations and inequalities, distance and midpoint formulas, functional notation, graphing of functions including straight lines, absolute values, polynomials, exponential and logarithmic, solving equations involving radicals; solving polynomial, exponential and logarithmic equations. Use of scientific calculator. *Prereq.* Math diagnostic exam or MTH 4006 or equivalent.

MTH 4108 Pre-Calculus* (4 q.h.)

Topics include trigonometric functions of angles in degrees and radians; trigonometric identities and equations; right triangles; law of sines and cosines; inverse trigonometric functions; polar coordinates; complex numbers in trigonometric form;

**This is a School of Engineering Technology course, which is offered at a different tuition rate than that of University College.*

systems of linear and nonlinear equations; determinants; binomial theorem; arithmetic and geometric sequences and series; and conic sections. *Prereq.* MTH 4107.

MTH 4110 Math 1 (3 q.h.)

Exponents, polynomials, factoring, radicals, algebraic fractions, linear equations, and word problems. *Prereq.* one year of high school algebra or its equiv. A placement test is given during the first class meeting. Students who obtain an unsatisfactory score on this test are advised to enroll in MTH 4001 Introductory to Math for additional preparation. Credit for this course cannot be applied to School of Engineering Technology degree programs.

MTH 4111 Math 2 (3 q.h.)

Word problems, quadratic equations and related problems, graphs and functions, and systems of equations. *Credit for this course cannot be applied to School of Engineering Technology degree programs. Prereq.* MTH 4110 or equiv.

MTH 4112 Math 3 (3 q.h.)

Exponential and logarithmic functions, sequences, and series. Introduction to calculus. *Credit for this course cannot be applied to School of Engineering Technology degree programs. Prereq.* MTH 4111 or equiv.

MTH 4113 Mathematics (Intensive) (9 q.h.)

Same as MTH 4110, MTH 4111, and MTH 4112.

MTH 4114 Mathematics 1 and 2 Combination (6 q.h.)

Same as MTH 4110 and MTH 4111.

MTH 4120 Calculus 1* (4 q.h.)

Topics include plane analytic geometry of the line and circle; review of inequalities and general function operations; theory and evaluation of limits; derivatives of algebraic and trigonometric functions; general rules of differentiation; Rolle's theorem, mean value theorem; applications of differentiation including velocity, acceleration, related rates, maximum, minimum, curve sketching, and approximations by differentials. Solving the equation $f(x) = 0$ by applying Newton's Method. *Prereq.* MTH 4108.

MTH 4121 Calculus 2* (4 q.h.)

Examines antiderivative and development of the fundamentals theorem with applications to areas, volumes, and rectilinear motion problems. Topics include the logarithmic exponentials, and inverse trigonometric functions and their applications; techniques of integration including parts, partial fractions, substitution, and the use of tables, numerical integration (Simpson's and Trapezoidal Rule); L'Hospital's Rule; improper integrals, and the geometry of vectors in a plane and space. *Prereq.* MTH 4120*.

MTH 4122 Calculus 3* (4 q.h.)

Studies three-dimensional space and a treatment of functions of several variables; multiple integrals with applications in areas and volumes; sequences and series; differential equations, including the solution with applications of first-order with variables separable, first-order linear, and second-order linear homogeneous to complete the sequence. *Prereq.* MTH 4121*.

MTH 4123 Differential Equations* (4 q.h.)

Linear differential equations with constant coefficients, homogeneous and nonhomogeneous, are examined. Explores the variation of parameters and undermines coefficients and simultaneous differential equations, the Laplace transform series and solution of differential equations, and the Fourier series. Orthogonal functions and numerical solutions of differential equations are studied. *Prereq.* MTH 4122*.

MTH 4130 Fundamentals of Calculus 1 (3 q.h.)

Introductory course intended for students in liberal arts, business administration, and other nonengineering curricula. Includes fundamentals of differential calculus, rules of differentiation, rates of change, graph sketching, and growth and decay function. *Credit for this course cannot be applied to School of Engineering Technology degree programs. Prereq.* MTH 4112 or equiv.

**This is a School of Engineering Technology course, which is offered at a different tuition rate than that of University College.*

MTH 4131 Fundamentals of Calculus 2
(3 q.h.)

Applications of differential calculus, including problems in optimization, velocity and acceleration, compound interest, population growth, and the fitting of equations to data. Introduces integral calculus, areas, average values of functions, marginal cost and profit, and depreciation. *Credit for this course cannot be applied to School of Engineering Technology degree programs. Prereq. MTH 4130 or equiv.*

MTH 4132 Fundamentals of Calculus 3
(3 q.h.)

Calculus of trigonometric functions, techniques of integration, numerical methods, and differential equations. Applications include pricing, allocation of funds, present value of an investment, manufacturing efficiency, and product reliability. *Credit for this course cannot be applied to School of Engineering Technology degree programs. Prereq. MTH 4131 or equiv.*

MTH 4140 Mathematics for Business Management 1 (3 q.h.)

Mathematics topics applicable to business management, such as linear equations and inequalities, matrix algebra, linear programming, sets, and counting techniques. *Prereq. MTH 4112 or equiv.*

MTH 4141 Mathematics for Business Management 2 (3 q.h.)

Business applications of probability, decision theory, Markov chains, game theory, and competitive analysis. *Prereq. MTH 4140.*

MTH 4143 Mathematics for Business Management (Intensive) (6 q.h.)

Same as MTH 4140 and MTH 4141.

MTH 4520 Statistically Thinking (3 q.h.)

Introduction to statistical mode of thinking. Presents the essential logic of statistical analysis to allow the student to critically evaluate research published in professional journals as well as newspapers. The process of collecting, analyzing, and interpreting data is discussed, as well as the use of computers in statistical analysis. Lectures used in conjunction with discussions of outside readings to illustrate concepts.

MTH 4700 Advanced Tutorial 1 (3 q.h.)

Opportunity to take upper-level course independently. See page 21 for details. *Prereq. 87 q.h.*

MTH 4701 Advanced Tutorial 2 (3 q.h.)

See MTH 4700.

MUSIC

MUS 4100 Introduction to Music (3 q.h.)

Selected works from earliest times to contemporary styles. Primarily a survey and listening course that emphasizes styles, basic theory, forms, and the historical, social, and artistic periods each work represents.

MUS 4103 Music and Society (3 q.h.)

The artist's involvement with recurring social themes such as self-image, the search for peace and understanding, personal relationships, and others. Examines paintings and literary works in addition to works by Beethoven, Schoenberg, Britten, and selected jazz composers.

MUS 4105 Music of the U.S.A. (3 q.h.)

American music from Puritan psalm singing to the present. Covers folk

music of ethnic origin, concert music, ragtime, jazz, and contemporary styles.

MUS 4106 Women in Music (3 q.h.)

The historical role of women in music, as composers, performers, patrons, and inspiration.

MUS 4110 Music in Popular Culture (3 q.h.)

Investigation of American attitudes toward culture, art, and beauty through consideration of contemporary popular music. Compares the different styles of pop music (jazz, rock, MOR, and R&B) and traces their evolution. Examines the manipulation of public tastes by large corporations for commercial purposes.

**This is a School of Engineering Technology course, which is offered at a different tuition rate than that of University College.*

MUS 4111 Rock Music (3 q.h.)

History of rock music from its origins in American blues and other styles through the popular music of the 1950s, the political styles of the 1960s, and the diverse trends of the 1970s. Emphasizes the formative years of rock.

MUS 4112 Jazz (3 q.h.)

Jazz, from its origins in New Orleans to the avant-garde experiments of today. Includes analysis of the rhythmic, harmonic, instrumental, and stylistic characteristics of jazz. Covers the works of such creative jazz artists as Armstrong, Beiderbecke, Parker, Ellington, and Coltrane.

MUS 4120 History of Musical Styles (3 q.h.)

Chronological examination of Western music, including its role in society and the contributions of influential Western composers. Reviews representative works from each period, with music by Bach, Handel, Haydn, Mozart, Beethoven, Brahms, Berlioz, Wagner, Mahler, and Stravinsky.

MUS 4121 Medieval and Renaissance Music (3 q.h.)

Development of sacred and secular monophony, vocal and instrumental works, and polyphonic music from their beginnings to about 1600.

MUS 4122 Music of the Baroque (3 q.h.)

The period of the emergence of the orchestra, the chorus, and the virtuoso performer and the development of the oratorio, opera, concerto, and symphony in the works of Monteverdi, Corelli, Vivaldi, Handel, and J. S. Bach.

MUS 4123 Music History of the Classical Period (3 q.h.)

Study of changing musical styles from Stamitz and the Mannheim School through the works of Haydn, Mozart, and early Beethoven.

MUS 4124 Music History of the Romantic Era (3 q.h.)

Musical styles of the nineteenth century, including the role of music and the musician in the changing social, economic, political, and cultural structure of Europe. Analyzes music by Beethoven, Schubert, Berlioz, Brahms, Verdi, and Wagner.

MUS 4125 Music History of the Twentieth Century (3 q.h.)

The diversity of styles from Debussy through Stravinsky, Schoenberg, Bartok, and Hindemith and more recent developments, including *musique concrète*, chance music, and electronic music.

MUS 4130 The Symphony (3 q.h.)

The symphony as the major genre in the Classical, Romantic, and contemporary periods. Covers works by Haydn, Mozart, Beethoven, Schumann, Tchaikovsky, Brahms, and Sibelius.

MUS 4132 The World of Opera (3 q.h.)

Opera as a dramatic form, including discussion of aria, recitative, ensemble, and other basic elements. Considers numbers opera, music drama, and *Singspiel* and such composers as Mozart, Wagner, Verdi, and Puccini.

MUS 4133 Great Choral Literature (3 q.h.)

Sacred and secular choral literature from medieval to contemporary times.

MUS 4136 Music and Art (3 q.h.)

How European composers used the works of Spanish, English, and German painters as inspiration for their musical scores. Analyzes European museum paintings and their musical counterparts to give students an understanding of the broad influence of art on musical composition.

MUS 4137 Music of the Dance (3 q.h.)

The world of the dance, with emphasis on the creative art of ballet. Probes the dynamic qualities of music for the dance and the people who brought it to its present position as a fusion of all the arts.

MUS 4138 American Musical Theatre (3 q.h.)

Historical survey and analytical study of musical shows. Students attend performances and write critical reviews.

MUS 4140 Life and Works of Mozart (3 q.h.)

Mozart's musical development from child prodigy to mature artist, traced from his own letters and from biographies. Includes analysis of many of his major works, including operas, symphonies, concertos, and chamber music.

MUS 4141 Life and Works of J. S. Bach
(3 q.h.)

The genius who summed up the Baroque era and whose every note reflected his profoundly humanistic approach to religion. Works examined include large choral masterpieces, such as the *St. Matthew Passion*, the *Brandenburg Concertos*, the *Well-Tempered Clavier*, and the *Suites*.

MUS 4144 Life and Works of Debussy
(3 q.h.)

Debussy's impressionist music as the turning point toward modern trends. Studies much of his work for piano, orchestra, and opera, including *Suite pour le Piano*, *Suite Bergamasque* ("Clair de Lune"), *Images* for piano and orchestra, *Nocturnes*, *La Mer*, and the opera *Pelleas and Melisande*.

MUS 4145 Life and Works of Beethoven
(3 q.h.)

The complex personality and art of this figure, including his relation to the turbulent times in which he lived and his role in Classical and Romantic music.

MUS 4163 Sound Health: Music and Relaxation (3 q.h.)

Opportunity to experience a heightened awareness of the power of music to effect physical and emotional change, and to examine the effects of music on the body, mind, and spirit. An exploration into the awareness of sound and the physiological changes caused by music. Covers theories and techniques used to facilitate positive change, relaxation, and reduction of stress. Includes sound pollution, the effects of vibrations on the body, guided imagery, music and meditation, and New Age and environmental music.

MUS 4164 Sound Health: Music and Relaxation 2 (3 q.h.)

This course allows each student to strengthen his/her ability to work with specific techniques for using music to facilitate relaxation, stress reduction and inner healing for personal use or in a health care setting. Emphasis will be on creating healing imagery, choosing appropriate music, and vocal techniques. *Prereq.* MUS 4163.

MUS 4165 The Music Industry (3 q.h.)

Business-related areas of the music industry. Addresses the structure of the record industry and music publishing world, the function of performing rights organizations (ASCAP and BMI), and the role of concert and orchestral managers. Features guest lecturers from various fields and trips to "behind-the-scenes" locations.

MUS 4168 Building a Career in Musical Performance (3 q.h.)

Designed for performers representing themselves or for those interested in managing other artists. Topics include auditions, job investigation, resumes, photographs, press-kits, recording, and debut recitals. Students assemble press kits, write press releases and PSAs, and learn effective ways to garner and handle publicity, to differentiate among the various audio and video formats, and essay their ideas on novel methods of promoting themselves or others.

MUS 4171 Computers and Music (3 q.h.)

History of the use of computers for music composition, music and sound analysis, sound sampling and synthesis, and music scoring and printing. Emphasizes the latest technology, including the use of MIDI (Musical Instrument Digital Interface). Also features hands-on use of computers, music software, and synthesizers.

MUS 4172 The Recording Studio (3 q.h.)

The history and methods of audio reproduction from Edison's gramophone to today's multi-track digital techniques. Includes instruction and hands-on experience at the recording facility in the College's new Media Studio. Guest lectures from experts in the field and visit to a local professional studio. (Additional fee required for studio work.)

MUS 4180 Introduction to World Music (3 q.h.)

The varied musical cultures of non-Western societies. Exploration of characteristics common to all musical systems, followed by investigation of music in the Middle East, southern and eastern Asia, Africa, South and Central America, and the Caribbean.

MUS 4181 Music of Africa (3 q.h.)

The music of Africa is as varied as its many linguistic and tribal identities. Surveys the breadth of African musical traditions and their historical, social, and cultural background as well as Africa's approaches to musical organization, musical practice, and significant aspects of style. Also examines the possible contributions to contemporary African-American music.

MUS 4182 Music of the Middle East (3 q.h.)

Introduction to the music and traditional instruments of selected Near Eastern and Arab cultures, such as Persian culture in the East and Ethiopian and Berber cultures in Africa. Also, cantillation styles and practices of various chants of the Hebrew, Christian, and Islamic traditions.

MUS 4200 How to Read and Write Music (3 q.h.)

Basics of musical notation for students with little or no theory or performance background. Focuses on the use of the symbols of pitch and duration. Includes sight reading simple melodies, following scores, arranging music for small instrumental groups, transposition, and elementary rhythmic and melodic composition.

MUS 4201 Music Theory 1 (4 q.h.)

Basics of music theory as a foundation for further musical study and activity. Begins with aural and visual identification of pitches, intervals, major and minor scales, and triads in the *G* and *F* clefs. Includes rhythmic and simple melodic dictation, sight-reading, elementary melodic writing, and chord construction.

MUS 4202 Music Theory 2 (4 q.h.)

Visual identification of pitches in the soprano, alto, and tenor clefs; transposition; some elementary arranging; writing and aural identification of cadences; elementary musical analysis; melodic and rhythmic dictation; and sight reading. *Prereq.* MUS 4201 or equiv.

MUS 4203 Music Theory 3 (4 q.h.)

Continuation of MUS 4202. Covers elementary four-part writing, introduc-

tion to figured bass, score reading, and harmonic analysis. Activities include harmonic as well as melodic dictation and part singing by sight. *Prereq.* MUS 4202.

MUS 4231 Musical Performance 1 (1 q.h.)

Participation in rehearsals and public performances and/or research; and composition, arranging, conducting, and solo and ensemble activity with the NU Symphony Orchestra, the Early Music Players, the NU Chorus, the NU Bands, or other ensembles under the supervision of a faculty member. Evaluation of student progress at the end of the quarter by audition or other method. *Prereq.* audition or instructor's permission.

MUS 4232 Musical Performance 2 (1 q.h.)

Continuation of MUS 4231. *Prereq.* MUS 4231.

MUS 4233 Musical Performance 3 (1 q.h.)

Continuation of MUS 4232. *Prereq.* MUS 4232.

MUS 4234 Musical Performance 4 (1 q.h.)

Continuation of MUS 4233. *Prereq.* MUS 4233.

MUS 4235 Chamber Music 1 (3 q.h.)

Weekly one-hour sessions for rehearsal, study, and performance of music for two to six players (matched according to level) under the guidance of a faculty coach. Repertoire selected from the full range of European concert music by the instructor in consultation with the students. Special tuition rate for Northeastern University staff. For details, contact the Department of Music, 307 Ell Building, 617-437-2440.

MUS 4236 Chamber Music 2 (3 q.h.)

Continuation of MUS 4235. *Prereq.* MUS 4235 or instructor's permission.

MUS 4237 Chamber Music 3 (3 q.h.)

Continuation of MUS 4236. *Prereq.* MUS 4236 or instructor's permission.

MUS 4241 Piano Class 1 (3 q.h.)

For beginning piano students who want to progress at their own pace. Grades are awarded after passing various step levels. Ownership of a piano is not required.

MUS 4242 Piano Class 2 (3 q.h.)

Introduction of scales, arpeggios, and triads to help students perform more advanced music. Repertoire consists of original compositions by the instructor and simple works by Bartok and Kabalevsky. *Prereq.* MUS 4241 or equiv., or instructor's permission.

MUS 4243 Piano Class 3 (3 q.h.)

Two-octave scales, arpeggios, and triads in all keys. Repertoire consists of Bartok, Kabalevsky, original compositions by the instructor, and duets specifically arranged for this course. *Prereq.* MUS 4242 or equiv., or instructor's permission.

MUS 4244 Voice Class (3 q.h.)

Basic vocal production required for fine singing. Repertoire, both classical and contemporary, is chosen for each student to learn and perform in lessons and outside of class. Includes lectures concerning diction, the physiology of singing, resonance, registers, interpretation, and the basics of music reading and sight-singing. Also includes class analysis of recordings of great vocal artists.

MUS 4247 Guitar Class 1 (3 q.h.)

Intended for beginners. Covers basic classical guitar techniques, including proper sitting and hand positions, note reading, and ensemble playing. Instruments, preferably nylon-strung, are required.

MUS 4248 Guitar Class 2 (3 q.h.)

Intended for those who have taken MUS 4247 or who already have a basic knowledge of classical guitar techniques and note reading. Introduces both solo and ensemble repertoire suitable to the advanced beginner. *Prereq.* MUS 4247 or instructor's permission.

MUS 4249 Guitar Class 3 (3 q.h.)

Continuation of MUS 4248, with repertoire suitable for early intermediate students. *Prereq.* MUS 4248 or instructor's permission.

MUS 4250 Conducting (3 q.h.)

Introduction to how to develop a clear beat technique and prepare, teach, and polish a work in rehearsal. Provides exposure to a basic repertoire and the

essentials of vocal-instrumental production. *Prereq.* *Fundamental knowledge of music reading and concurrent membership in a performing ensemble.*

MUS 4261 Music Instruction (1 q.h.)

Individual instruction in a musical instrument or in voice. Lessons may be arranged on a 45-minute basis. Contact the Dept. of Music (437-2440) for details. Special fees. May be repeated for credit.

MUS 4270 Synthesizer Class (3 q.h.)

Intended for beginners. Covers basic keyboard techniques and music-reading skills, as well as utilization of the special features of some of the more popular digital synthesizers.

MUS 4301 Form and Analysis (3 q.h.)

The principles of unity and variety in musical composition. Representative works from all periods of Western music are used to analyze and study such single-member forms as theme and variation, rondo, minuet and trio, sonata-allegro, passacaglia, canon, and fugue. *Prereq.* MUS 4203 or equiv.

MUS 4541 Master Class 1 (3 q.h.)

Advanced instruction in a musical instrument or in voice given by a leading expert in the field. Students perform selected repertoire in class under the guidance of the "master" who uses the students' performances as a springboard for an illustrated discussion of performance practice and techniques. For details contact the Department of Music, 351 Ryder Hall, 617-437-2440. *Prereq.* audition or instructor's permission.

MUS 4542 Master Class 2 (3 q.h.)

Continuation of MUS 4541.

MUS 4543 Master Class 3 (3 q.h.)

Continuation of MUS 4542.

MUS 4810 Honors Program 1 (4 q.h.)

Opportunity to undertake an in-depth research study project. See page 21 for details. *Prereq.* 96 q.h., 3.5 q.p.a.

MUS 4811 Honors Program 2 (4 q.h.)

See MUS 4810.

MUS 4812 Honors Program 3 (4 q.h.)

See MUS 4810.

MUS 4815 Advanced Tutorial 1 (3 q.h.)
Opportunity to take an upper-level course independently. See page 21 for details. *Prereq.* 87 q.h.

MUS 4816 Advanced Tutorial 2 (3 q.h.)
See MUS 4815.

MUS 4820 Independent Study 1 (3 q.h.)
Opportunity to undertake special

research. See page 21 for details.
Prereq. 96 q.h., 3.0 q.p.a.

MUS 4821 Independent Study 2 (3 q.h.)
See MUS 4820.

MUS 4822 Independent Study 3 (3 q.h.)
See MUS 4820.

NURSING

NUR 4300 Nursing Transition (9 q.h.)
The first nursing course for registered nurses in the bachelor's degree program, introducing program objectives and philosophy. Through guided and independent study, covers roles and role conflicts, communication, group dynamics, and the nursing process, specifically with patients experiencing the stresses of aging, chronic and long-term illness, and the presence of death. Also examines human nutritional needs, with emphasis on the aged and chronically ill. Registration by permission of the Academic Coordinator one full quarter in advance of registration. Open only to matriculated BSN students. *Prereq.* BIO 4105, BIO 4177, BIO 4190, CHM 4113, PSY 4112, and ENG 4112.

NUR 4301 Psychiatric/Mental Health Nursing (7 q.h.)
Development of knowledge of mental and emotional illness through a basic understanding of the dynamics of human behavior and beginning skills in therapeutic intervention. Also introduces the concepts of family and group therapy and crisis intervention techniques. Registration by permission of the Academic Coordinator. *Prereq.* NUR 4300.

NUR 4302 Pharmacodynamics (3 q.h.)
(Open to all students.)
Intended for registered nurses. Introduces pharmacologic principles, the pharmacotherapeutics of drug groups, and individual drug substances of particular importance in the treatment and diagnosis of disease. *Prereq.* CHM 4113.

NUR 4303 Life Crisis Analysis and Response (4 q.h.) (Open to all students.)
This interdisciplinary course concerns personal, family and community crisis

identified from the literature health agency clientele and personal experiences. Concepts from nursing, sociology, anthropology and social psychology are used to assess the crisis and develop strategies for dealing with them. Special emphasis will be placed on approaches used by providers in human service systems to help people in crisis, ex: at times of death, divorce, job loss, illness, rape etc. *Prereq.* SOC 4100, SOC 4101 or permission of instructor.

NUR 4400 Maternal and Child Nursing (9 q.h.)

Maintaining optimal health for child-bearing and child-rearing families from various cultural and social backgrounds. Students examine individuals at selected developmental stages. Provides opportunities to apply the nursing process in client-care settings and to assist families in coping with stresses that interfere with health. Registration by permission of the Academic Coordinator. *Prereq.* NUR 4300, NUR 4302, and PSY 4241.

NUR 4401 Medical-Surgical Nursing (9 q.h.)
Effects of acute illness on individuals, families, and society. Discusses alterations and adaptations in physiology characteristic of acute illness, the nurse's role, the impact of illness on living patterns, and the need for health education and continuity of care. Includes guided clinical experiences, emphasizing the nursing process and the development of skills necessary to care for the acutely ill adult. Registration by permission of the Academic Coordinator. *Prereq.* NUR 4300, NUR 4301, NUR 4302, and PSY 4241.

NUR 4402 Health Assessment (4 q.h.)
(Open to any Registered Nurse.)
Additional theory and skills relevant to the clinical, decision-making role of the nurse as a primary caretaker, including history-taking and physical and psychosocial assessment. Emphasis is on how the analysis and synthesis of data obtained from a holistic health assessment leads to the identification of common health abnormalities and enhances clinical decision-making skills. Limited enrollment.

NUR 4500 Community Health Nursing (9 q.h.)
Introduction to ways in which families, groups, and communities meet the health and welfare needs of their members, with particular attention to the nurse's role. Includes the political implications of health care delivery and current research affecting family and group health and community nursing. Laboratory experience involves work with individuals, families, and communities. Registration by permission of the Academic Coordinator. Open only to matriculated BSN students. *Prereq.* NUR 4300,

NUR 4302, NUR 4400, NUR 4401, PSY 4242, and SOA 4102.

NUR 4501 Contemporary Nursing (5 q.h.)
Intended for seniors. Covers current trends and issues in nursing and health care delivery. Students define their objectives, pursue an area of nursing in which they are particularly interested, and evaluate their own performance. Synthesizes major concepts through lectures, seminars, and student participation. Registration by permission of the Academic Coordinator. Open only to matriculated BSN students. *Prereq.* NUR 4301, NUR 4400, NUR 4401, SOA 4102, and PSY 4242.

NUR 4502 Introduction to Nursing Research (4 q.h.)
Builds on prior exposure to selected nursing studies. Covers qualitative and quantitative research and the value of each to nursing and the health care field. Also discusses the importance of nursing to both practitioner and consumer. Open only to matriculated BSN students. *Prereq.* NUR 4300, NUR 4301, NUR 4302, NUR 4400, NUR 4401, SOA 4102, and PSY 4242.

PHYSICAL EDUCATION

PED 4200 Cardiovascular Health and Exercise (3 q.h.)
Structured exercise program meeting three times per week and offering a choice of jogging, swimming, or aerobic exercise classes and a weekly cardiovascular health lecture. Participants receive two comprehensive cardiovascular medical and physical fitness evaluations, prior to and at the completion of the program. Includes a cardiopulmonary examination by a

cardiologist, blood chemistry profile, pulmonary function testing, resting EKG, graded exercise treadmill (stress) test with EKG and blood pressure evaluation, assessment of percent body fat (ideal weight and projected weight loss where applicable), and functional assessment of the lower back. Each participant receives a computerized report; individual exercise programs are based on test results. (Laboratory fee.)

PHILOSOPHY

PHL 4100 Philosophical Thinking (3 q.h.)
Methods and values of thinking philosophically. Reveals strategies of dialogue and of informational discovery through understanding and use of the Socratic method of intellectual exchange. Analyzes the universal quest for truth in order to distinguish between knowing and not knowing, dogma, and ignorance. Proves value issues through questions in ethics and moral philosophy.

PHL 4105 Philosophy of Knowing and Reality (3 q.h.)
The difference between knowledge and belief. Areas of theoretical focus include the nature of ultimate reality, the nature of human knowledge, and the nature and existence of God. The investigation of a variety of problems and alternative solutions helps students think independently and self-critically. Emphasizes the development of discipline and precision in communicating ideas.

PHL 4110 Philosophy of Right and Justice
(3 q.h.)

Ethics and social and political philosophy. In ethics, addresses the questions "What sorts of things are good or bad?" and "What actions are right or wrong?" In social and political philosophy, examines theories of human nature, social change, social institutions, and major twentieth-century political theories. Possible additional topics include aesthetics and philosophy of history.

PHL 4165 Moral Problems in Medicine
(3 q.h.)

Social and moral problems created by medical science. Questions investigated include "Should a human life be prolonged under any condition and at any cost?" "What are the moral problems caused by the current medical definitions of death?" and "Is it morally right to predetermine the physical characteristics of future generations by genetic engineering?"

PHL 4170 The Human Search for Meaning
(3 q.h.)

Examination of selected philosophical problems of human existence, such as freedom, death, sexuality, alienation, and becoming a person.

PHL 4180 Business Ethics (3 q.h.)

Ethical principles and considerations involved in making moral business decisions. Studies basic ethical viewpoints as a foundation; analyzes specific characteristics of business life through particular cases and examples.

PHL 4200 Logic (3 q.h.)

Essentials of lucid thinking in terms of basic logical concepts, including deductive and inductive reasoning, valid and invalid arguments, and the varied functions of language and definition. Also examines how to recognize and evaluate different kinds of arguments, methods of detecting and avoiding common errors in reasoning, and the link between structured thought and effective communication.

PHL 4220 The Meaning of Death (3 q.h.)

Various philosophical and religious views concerning the meaning of death. Discusses such questions as

"What attitude should one take regarding one's own death?" "What role does death play in our personal relations to others?" and "Is it necessary to believe in an afterlife in order to give meaning to this life?"

PHL 4223 Philosophy of Consciousness
(3 q.h.)

Theories of consciousness, the possibility of higher states of consciousness, and some techniques, such as meditation, alleged to lead to higher states of consciousness. Readings may include psychological and parapsychological literature on the subject.

PHL 4230 Ethics in Theory and Practice
(formerly Ethics 1) (3 q.h.)

Major ethical theories, emphasizing ethical naturalism, utilitarianism, moral sense theories, intuitionism, and theological theories. Applications of these theories are discussed and compared.

PHL 4231 Current Topics in Ethics (formerly Ethics 2) (3 q.h.)

Problems and issues encountered in important areas of moral concern, such as euthanasia, punishment, professional conduct, and moral responsibility in general. Explains various approaches to these problems within the framework of major ethical theories.

PHL 4235 Personal Ethics (3 q.h.)

As we live our lives, we face many decisions about the "rightness" or "wrongness" of our ideas and actions. Explores two different approaches to moral dilemmas: utilitarian theory, which defines the good as the best possible outcome, and deontological theory, which states that actions themselves are either good or evil. Applies these ethical theories to the moral choices we make on issues such as abortion, the AIDS epidemic, capital punishment, nuclear arms, and taxation.

PHL 4243 Existentialism (3 q.h.)

Existential philosophy as understood through study of its greatest representatives, such as Kierkegaard, Nietzsche, Dostoyevsky, Heidegger, Jaspers, Camus, Sartre, and Merleau-Ponty. Focuses on the central themes of self-alienation, authenticity, and existential experiences.

PHL 4245 Philosophy of Religion (3 q.h.)

The arguments for the existence of God. Covers natural and moral evil, the soul, immortality, the evidence for miracles, and the nature of religious knowledge.

PHL 4247 Theistic, Atheistic, and Agnostic Philosophies (3 q.h.)

Selected theistic, atheistic, and agnostic philosophies. Questions studied include: "Is the belief in God necessary for a comprehensive philosophy of life?" "How does an atheistic philosophy explain and justify the 'higher values' such as love, beauty, and justice?" and "How is it possible to base a philosophy on the principle of agnosticism?"

PHL 4249 Women's Spirituality (formerly Feminist Spirituality) (3 q.h.) Women's religious experience as described in classical and contemporary sources. Readings include such works as *Womanspirit Rising*, *The Politics of Women's Spirituality*, and *Dreaming the Dark*.

PHL 4250 Philosophy of Human Nature (3 q.h.)

Philosophical and literary study of human nature. Questions include "What is human nature?" and "What is a human being?" Examines some of the philosophical answers to these questions, with special attention to the significance of tradition, social role, freedom, and decision.

PHL 4251 Images of Women in Philosophy (3 q.h.)

Philosophical approach to the study of women in society. Drawing from sources within the history of philosophy and literature, includes the role (ideal and actual) of women in society, love and marriage, oppression and isolation, and the cult of virginity.

PHL 4252 Women's Ethical Issues (3 q.h.)

The emerging feminist ethos as distinct from traditional descriptions of feminist morals and values. Discusses questions of politics, power, values, and actions. Readings include such works as De Beauvoir's *The Ethics of Ambiguity* and Daly's *Gyn-Ecology*.

PHL 4255 Women and Religion (3 q.h.)

The role and place of women in the major religions of the world and contemporary feminist challenges to these traditional understandings. Readings include such works as Carmody's *Women and Religion* and Daly's *Beyond God the Father*.

PHL 4256 Introduction to Feminist Thought (3 q.h.)

Introduction to feminist scholarship in various fields. Explore what constitutes knowledge when women's experiences rather than men's, frame the questions, provide the data, and interpret that data.

PHL 4265 Contemporary Religious Issues in America (formerly Understanding Religion in America Today) (3 q.h.)

Study America's remarkable religious pluralism. Includes contemporary Christianity and Judaism, nontraditional Christian and non-Christian movements, cults, sects, and quasireligious organizations. After becoming familiar with American religious foundations, students study the connections between religion and sociotechnological change, sex, biomedical ethics, politics, and the media. May include guest speakers.

PHL 4266 The Religious Right in Contemporary America (3 q.h.)

Evangelism, fundamentalism, extremist groups, and nontraditional Jewish and Christian movements. Also examines "priesthood of all believers," grace and the idea of the "elect," and the state of being "born again" as well as the New Deal, the Great Society, and the "conservative revolution." Includes background on the roots of these movements, from precolonial Europe and Puritan America to the development of the Social Gospel. May include guest speakers.

PHL 4270 The Great Western Religions (3 q.h.)

Study of the basic teachings of Judaism, Christianity, and Islam.

PHL 4273 Judaism (3 q.h.)

Philosophy of the Jewish religion, its metaphysical and ethical beliefs, and the philosophical origins of these beliefs.

PHL 4275 The Great Eastern Religions (3 q.h.)
Study of the basic teachings of Taoism, Confucianism, Buddhism, Hinduism, and Shintoism.

PHL 4277 Hinduism (3 q.h.)
The Hinduism of the *Upanishads*, the most explicit of the mystical religions. Also includes the devotional aspect of Hinduism as expressed in the *Bhagavad Gita*.

PHL 4279 Buddhism (3 q.h.)
Central teachings of Buddhism, including the doctrines that there is no independently existing immutable self or soul, that all phenomena are impermanent, that existence is suffering, that suffering has a cause, and that there is a way to eliminate suffering.

PHL 4280 Islam (3 q.h.)
History of Islam, its conflicts with the West in the past and in the present, Islamic beliefs, and the future of Islam as a world religion.

PHL 4293 Mysticism: East and West (3 q.h.)
Inquiry into mystical experience through a comparative study of the writings of Christian, Buddhist, and Hindu mystics and of secondary interpretive sources. Explores the potential oneness of humanity with God, the conflict of mysticism with traditional forms of religion, and the possibility of a common, cross-cultural basis for mysticism.

PHL 4315 Understanding the Bible: The Old Testament (3 q.h.)
Exploration of the traditions of the Hebrew people in cultural and historical perspective. Topics to be considered include changing ideas of the nature of God, the roles of prophet, priest, and king, and the development of the covenant motif.

PHL 4316 Understanding the Bible: The New Testament (3 q.h.)
Christianity began as a reform movement within Judaism but soon became a unique religious tradition. Examines earliest Christianity in its cultural and historical setting focusing on the Gospel portraits of Jesus, the Kingdom of God, theories of afterlife, and Pauline theology.

PHL 4330 The Encounter of Psychology and Religion (3 q.h.)
Exploration of the ways the sense of self shapes and is shaped by religion. Emphasis on dominant Western psychologies and religions. Examination of the role of religious values in defining cultural values, and of these values in determining a sense of self.

PHL 5220 The Meaning of Death (3 CEUs)
Same as PHL 4220.

PHYSICS

PHY 4101 College Physics 1* (4 q.h.)
Introduction to mechanics, including units of measurement, vectors, accelerated motion, and Newton's laws of motion. Further topics include conservation of energy, work, momentum and introduction to elements of heat, mechanical waves and vibrating bodies. Laboratory experiments and classroom demonstrations are an integral component of this course. (This course is intended for the Health Professions and Science Programs and cannot be utilized for credit towards technology degrees in the School of Engineering Technology).

PHY 4102 College Physics 2* (4 q.h.)
Introduction to magnetism, magnetic fields, electromagnetic induction, elec-

trostatics and electric circuits. Further areas covered include appropriate topics in optics, nuclear and atomic physics. Laboratory experiments and classroom demonstrations are an integral component of this course. (This course is intended for the Health Professions and Science Programs and cannot be utilized for credit towards technology degrees in the School of Engineering Technology). *Prereq.* PHY 4101.

PHY 4117 Physics 1* (4 CH, 4 q.h.)
Topics include vectors and balanced forces, accelerated motion, Newton's laws, projectile motion, work and

**This is a School of Engineering Technology course, which is offered at a different tuition rate than that of University College.*

energy, momentum, angular motion, centripetal force, rotation of rigid bodies, and moment of inertia. *Prereq.* **MTH 4107** or concurrently.

PHY 4118 Physics 2* (4 q.h.)

Topics include elasticity, density and pressure, temperature, the gas laws, heat transfer, thermodynamics, vibratory motion, wave motion, properties of sound, and properties of light. *Prereq.* **PHY 4117**.

PHY 4119 Physics 3* (4 q.h.)

Topics include electric forces and fields, electric potential, direct current circuits, magnetic forces and fields, electromag-

netic induction, and alternating current circuits. *Prereq.* **PHY 4118**.

PHY 4173 Physics Laboratory 1* (2.3 lab, 2 q.h.)

Offers experiments in mechanics, elastic deformation, work, energy, thermometry, and calorimetry. *Prereq.* **PHY 4117**.

PHY 4174 Physics Laboratory 2* (2.3 lab, 2 q.h.)

Continues **PHY 4173**. Offers experiments in gas laws, wave motion, optics, electrical circuits, and nuclear and atomic physics. *Prereq.* **PHY 4173**.

POLITICAL SCIENCE

POL 4103 Introduction to Politics (3 q.h.)

Introduction to contemporary political science, including consideration of basic concepts in political analysis, the role of government institutions, political representation, political ideologies, and the scope and methods of political science.

POL 4104 Introduction to American Government (3 q.h.)

American governmental and political processes, constitutional institutions, political behavior, and liberties.

POL 4105 Introduction to Comparative Politics (3 q.h.)

Comparative study of constitutional and totalitarian systems, including the Western European and Soviet patterns.

POL 4106 Introduction to Politics (4 q.h.)

Basic political concepts and forces of organization from the classical Greeks to the modern nation-state. The Soviet Union and the United Kingdom are contrasted as contemporary illustrations of the institutional distinction between a totalitarian and a constitutional system. *For Alternative Freshman-Year students only.*

POL 4110 The Great Political Thinkers (3 q.h.)

Explore the great political thinkers from ancient Greece to the twentieth century. Probes the creative genius of such theorists as Plato, Aristotle, Aquinas, Hobbes, Hegel, Locke, Rousseau, Mill, and Marx.

POL 4300 Introduction to Public Administration (formerly Public Administration 1) (3 q.h.)

Introduction to the theory, forms, and processes of administration at the national and state levels.

POL 4301 Case Studies in Public Administration 2 (formerly Public Administration 2) (3 q.h.)

Case-study examination of the relationship between the theory and practice of public administration. *Prereq.* **POL 4300** or *equiv.*

POL 4302 Public Administration (Intensive) (6 q.h.)

Same as **POL 4300** and **POL 4301**.

POL 4303 Public Personnel Administration (3 q.h.)

Study basic elements of personnel administration, including recruitment, training, classification, promotion, and executive development. Pays special attention to current problems, such as equal opportunity, public employee unionism, and collective bargaining.

POL 4304 Public Budgeting (3 q.h.)

Politics, procedures, and goals of government budgeting at the federal, state, and local levels are covered. Includes expense, capital, and program budgeting.

POL 4305 Organizational Theory (3 q.h.)

Examine people and organizations, focusing on organizational and societal

**This is a School of Engineering Technology course, which is offered at a different tuition rate than that of University College.*

problems as a way of understanding how we can survive in a bureaucratic system.

POL 4306 Public Policy Analysis (3 q.h.)
Procedures for the analysis of public policy are studied, including discussion of selected cases of public policy at the local, state, or federal level.

POL 4307 The Politics of Health (3 q.h.)
Explore the problems of health in developing countries, particularly during the last decade. Examines the political dynamics at the village, national, and global levels that have hindered efforts to establish health care delivery systems. Analyzes issues of nationalism and problems of refugees.

POL 4310 American Political Thought (3 q.h.)
Topics include political thought from the Colonial period to the present, including study of the impact of religious, economic, and judicial theories on the structure of American ideas.

POL 4311 Research Methods (3 q.h.)
Introduction to some of the most common methods of conducting political science research. Includes problems of theory construction and data gathering and such analytical research tools as bibliographical aids and the computer.

POL 4312 Political Parties and Pressure Groups (3 q.h.)
Discuss party government in the United States and Great Britain, focusing on the interaction of party and government.

POL 4313 State and Local Government (formerly Government and Politics and the States) (3 q.h.)
State and local governments, their problems, and functional and operational responses to these problems are examined.

POL 4314 Urban and Metropolitan Government (3 q.h.)
Explore political, structural, and functional problems of an urbanizing United States. Includes an analysis of urban, suburban, and metropolitan governments.

POL 4318 The American Presidency (3 q.h.)
Study the nation's chief executive. Includes topics such as the presidential electoral process, the president's many constituencies, and the differing styles of twentieth-century presidents. Also covers constitutional and extraconstitutional powers of the office.

POL 4319 The Congress (3 q.h.)
Institutional and functional analysis of the roles of Congress are examined, as well as the chief executive, and political parties in the legislative process.

POL 4320 American Constitutional Law (3 q.h.)
A case analysis of the development of Federalism, the separation of powers, and the role of the federal and state courts in constitutional development.

POL 4321 Civil Liberties (formerly Civil Rights) (3 q.h.)
Examination of quality and content of civil liberties in the United States. Emphasizes the First, Fifth, Sixth, Fourteenth, and Fifteenth amendments to the Constitution.

POL 4322 Procedural Due Process (3 q.h.)
Study of due process in the American constitutional scheme.

POL 4325 The Politics of Films (3 q.h.)
The relationship between films and politics is explored. Films are analyzed for their political content and impact on specific controversies and on politics and society as a whole.

POL 4326 The Sixties (3 q.h.)
A political, philosophical, sociological and cultural analysis of the Sixties is presented. The major issues of that era are discussed: civil rights, the Vietnam War, the student movement. Special attention is given to the arts, including music and film.

POL 4327 Sex Roles in American Politics (3 q.h.)
Topics such as the roles of women in American government and politics, including the traditional roles—or absence thereof—of women in American politics, the suffrage movement, the impact of sex on achieving political power and office, the growing importance of the women's vote, the women's movement, and political action to support women's issues are covered.

POL 4330 Comparative Politics (3 q.h.)

Discuss political culture, organization, and behavior in different national settings.

POL 4331 International Relations (3 q.h.)

Study elements of and limitations on national power. Discusses contemporary world politics, problems of war, and peaceful coexistence.

POL 4332 International Organization (3 q.h.)

The development of international organizations, emphasizing the United Nations, specialized agencies, and regional organizations is explored.

POL 4333 International Law (3 q.h.)

Examine the procedural and substantive study of the legal relations among nation-states.

POL 4335 Formulating American Foreign Policy (3 q.h.)

The Constitution and political instruments for the formulation of American foreign policy are discussed.

POL 4336 American Foreign Policy (3 q.h.)

Study of recent and current American foreign affairs.

POL 4337 The Politics of Arms Control (3 q.h.)

Discuss the nuclear arms rivalry between the United States and the Soviet Union, along with opportunities for curtailing it through arms control. Includes the nature and purposes of nuclear weapons, past arms-control agreements, and recent breakthroughs. Explores current options for arms control.

POL 4338 European Political Parties (3 q.h.)

Emphasizes political party systems in England, France, and Germany, and their ideology, organization in and out of Parliament, electoral strategies, and voter behavior.

POL 4339 Government and Politics in the Soviet Union (3 q.h.)

Explore modern totalitarian theory and practice, follow up with studies of the ideological and historical bases of the Soviet dictatorship.

POL 4341 Soviet Foreign Policy (3 q.h.)

Discussion of the evolution of Soviet foreign policy since 1917, emphasizing

the development of the international Communist movement.

POL 4342 Communism in Eastern Europe (3 q.h.)

Study the conditions and circumstances surrounding the establishment of Communist regimes in eastern Europe following World War II and their relations with the Soviet Union.

POL 4350 Politics and Policies of the Developing Nations (3 q.h.)

Covers colonialism, the struggles for independence, and the common problems of developing nations. Includes economic development, urbanization, cultural fragmentation, and revolution.

POL 4352 Government and Politics of Latin America (3 q.h.)

Explore the historical background of the Latin American nations and their cultural, economic, social, and political characteristics, including political violence and the breakdown of democratic governments.

POL 4356 Government and Politics of Northern Africa (3 q.h.)

A comparative analysis of political culture, organization, and behavior of African states north of the Sahara, with emphasis on Morocco, Algeria, Tunisia, and Egypt.

POL 4357 Government and Politics of South Africa (3 q.h.)

An analysis of political culture, organization, and behavior of South Africa. Examines the South African history to show how South Africa got where it is today, including the nature, implications, and problems of apartheid, and prospects for the future.

POL 4359 Government and Politics in the Middle East (3 q.h.)

Political change, economic growth, and social adaptation in selected countries is discussed. The emergence of the Middle East from subjection to self-assertion is examined, focusing on such topics as the influence of Western Modernism, Muslim fundamentalism, inter-Arab rivalries, Arab-Israeli conflict, and the civil strife in Lebanon.

POL 4362 Government and Politics of Southeast Asia (3 q.h.)

Topics such as political instability and problems of establishing democratic structures and processes in the Philippines, Thailand, and India are explored.

POL 4364 China's Foreign Policy (3 q.h.)

Examine Beijing's relations with Africa, the rest of Asia, the Soviet orbit, and the West. Covers policy objectives, strategy, tactics, and the methods of decision making in both the party and state apparatus.

POL 4365 Government and Politics of China (3 q.h.)

Discuss Chinese political culture, emphasizing the nineteenth-century cultural, economic, and political impact of the West, the emergence of the Communist party under the leadership of Mao Tse-Tung, and the progressive disintegration of Kuomintang leadership.

POL 4367 Government and Politics of Japan (3 q.h.)

Examine the historical development of the Japanese nation, with particular attention to the growth of fascism and efforts to create a viable democracy since World War II.

POL 4370 Introduction to Political Theory (3 q.h.)

Development of the political ideas of the Western world, including the ideas of the major philosophers of Greece, Rome, the Christian Era, and the Renaissance is discussed.

POL 4371 Modern Political Theory (3 q.h.)

Exploration of political ideas and systems of political thought from Machiavelli to the present. *Prereq.* POL 4370 or equiv.

POL 4372 Contemporary Political Thought (3 q.h.)

Analyzes current ideas, ideologies, and political movements. Examination of such topics as neo-conservatism, neoliberalism, neo-Marxism, and women's liberation.

POL 4373 Islamic Political Thought (3 q.h.)

Introduction to Islamic thought and political theory. Analyzes such classical theorists as Avicenna, Aver-

roes, Al-Ghazali, and Ibn Khaldun; and such modern theorists as Abduh, Iqbal, and Shari'ath.

POL 4375 Consumer Advocacy 1 (3 q.h.)

A pragmatic course, designed to define and expand the role of consumers in the marketplace. Focuses on contemporary consumer issues, touching upon the legal, social, economic, and political aspects of consumer problems and the role of consumer lobbies as special interest groups. More specific consumer problems, such as those of the elderly, may also be explored.

POL 4376 Consumer Advocacy 2 (3 q.h.)

Continuation of POL 4375. *Prereq.* POL 4375 or equiv.

POL 4377 Consumer Advocacy 3 (3 q.h.)

Continuation of POL 4376. *Prereq.* POL 4376 or equiv.

POL 4378 Current Political Issues (3 q.h.)

Explore the constitutional and political basis of selected problems in American political life.

POL 4815 Advanced Tutorial 1 (3 q.h.)

Opportunity to take an upper-level course independently. See page 21 for details. *Prereq.* 87 q.h.

POL 4816 Advanced Tutorial 2 (3 q.h.)

See POL 4815.

POL 4820 Independent Study 1 (3 q.h.)

Opportunity to undertake special research. See page 21 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

POL 4821 Independent Study 2 (3 q.h.)

See POL 4820.

POL 4822 Independent Study 3 (3 q.h.)

See POL 4820.

POL 4830 Honors Program 1 (4 q.h.)

Opportunity to undertake an in-depth research study project. See page 21 for details. *Prereq.* 96 q.h., 3.5 q.p.a.

POL 4831 Honors Program 2 (4 q.h.)

See POL 4830.

POL 4832 Honors Program 3 (4 q.h.)

See POL 4830.

POL 5375 Consumer Advocacy 1 (3 CEUs)

Same as POL 4375.

PSYCHOLOGY

PSY 4110 Introduction to Psychology: Fundamental Issues (formerly Fundamental Issues in Psychology) (3 q.h.) Explore fundamental principles and issues of contemporary scientific psychology, which are approached as a method of inquiry as well as a body of knowledge. Examines the origins and methods of psychology, biological foundations of behavior, states of consciousness, learning, and memory.

PSY 4111 Introduction to Psychology: Developmental Aspects (formerly Developmental Aspects in Psychology) (3 q.h.)

Covers growth and the life-cycle, language, mental abilities, sensory and perceptual processes, and social interaction. *Prereq.* PSY 4110 or *equiv.*

PSY 4112 Introduction to Psychology: Personal Dynamics (formerly Personal Dynamics in Psychology) (3 q.h.)

Examines motivation, emotion, personality theory and measurement, abnormal psychology, and therapy. *Prereq.* PSY 4110 or *equiv.*

PSY 4113 Introduction to Psychology Intensive A (formerly Psychology Intensive) (9 q.h.)

Same as PSY 4110, PSY 4111, and PSY 4112.

PSY 4114 Introduction to Psychology Intensive B (6 q.h.)

Same as PSY 4110 and PSY 4111.

PSY 4220 Statistics in Psychology 1 (3 q.h.)

Scales of measurement in psychological research, measures of central tendency, and variability are discussed. *Prereq.* PSY 4111 and PSY 4112 or *equiv.*

PSY 4221 Statistics in Psychology 2 (3 q.h.)

Introduction to measures of correlation, introduction to probability, and statistical distributions. *Prereq.* PSY 4220 or *equiv.*

PSY 4222 Statistics in Psychology 3 (3 q.h.)

Explores parametric and nonparametric tests of significance, including chi square, t-test, F test, and simple analysis of variance. *Prereq.* PSY 4221.

PSY 4231 Psychology of Learning 1 (3 q.h.)

Study the basic principles and techniques of operant and Pavlovian condi-

tioning and their applications to therapeutic, educational, and specialized training programs. *Prereq.* PSY 4111 or PSY 4112 or *equiv.*

PSY 4232 Motivation (3 q.h.)

Topics include various aspects of motivation, including primary and secondary reinforcement, unconscious motivation, effectuate motivation, and the assessment of motives. *Prereq.* PSY 4112 or *equiv.*

PSY 4240 Development: Infancy and Childhood (formerly Developmental Psychology: Infancy and Childhood) (3 q.h.)

Human development from infancy through late childhood is explored. Covers physical, cognitive, and psychosocial development, including the development of language, morality, and interpersonal relationships.

PSY 4241 Development: Adolescence (formerly Developmental Psychology: Adolescence) (3 q.h.)

Examines development during the second decade of life, emphasizing the tasks and problems confronting the individual adolescent. Includes topics such as biological, social, and cognitive changes as they relate to the creation of a stable, individual identity.

PSY 4242 Development: Adulthood and Aging (formerly Developmental Psychology: Adulthood and Old Age) (3 q.h.)

Discuss the unique features and problems of development from the adult years to death. Emphasizes changes that accompany career, marriage, and family developments and the specific psychological adjustments required of the aging person.

PSY 4243 Aging and Mental Health (3 q.h.)

Emotional reactions to age-related issues, such as retirement, bereavement, and health status are covered. Discusses depression and suicide, behavior disorders, substance use problems, and the dementias of old age and the effects these problems have on families and the community. Includes a survey of special assessment techniques, mental health services for the elderly, and public health policies for improved care.

PSY 4262 Memory and Thinking (3 q.h.)
(formerly Cognitive Psychology)
Explores the mental processes involved in the acquisition, organization, and use of knowledge, including pattern recognition and memory. *Prereq.* PSY 4111, PSY 4112, or *equiv.*

PSY 4263 Psycholinguistics (3 q.h.)
Topics such as the nature and structure of language, various theories of human production and perception of language, and related experimental findings are covered. *Prereq.* PSY 4111 or *equiv.*

PSY 4270 Social Psychology 1 (3 q.h.)
Study the socialization process, social motives, interpersonal perception, and group membership and structure. *Prereq.* PSY 4111 or *equiv.*

PSY 4271 Social Psychology 2 (3 q.h.)
Topics include attitudes, prejudice and ethnic relations, leadership, mass behavior and social movements, and the effects of mass media on communication. *Prereq.* PSY 4270 or *equiv.*

PSY 4272 Personality 1 (3 q.h.)
The normal personality and its growth and development is studied. Includes concepts such as environmental and genetic contributions, assessment of personality, research, and a survey of the major personality theories. *Prereq.* PSY 4112 or *equiv.*

PSY 4275 Group Processes (3 q.h.)
An analysis of group structure and its effect on behavior. Topics include leadership, communication, conflict resolution, and group problem-solving. Student participation used to illustrate and develop group-related concepts.

PSY 4276 Stress and Its Management (3 q.h.)
An analysis of stress and its effects on human behavior. Considers the causes of stress from a variety of theoretical perspectives. Techniques and procedures for stress management and reduction examined in detail.

PSY 4280 Human Sexuality and Love (3 q.h.)
An examination, both theoretical and experimental, of psychological, biological, and social aspects of sex-

uality and loving. Topics include sexual anatomy and physiology; birth control; gender identity and gender role; romantic love (with emphasis on successful love relationships); diverse sexual lifestyles; sexual dysfunctions and therapy; and enhancement of one's own sexual awareness and pleasure and that of one's partner.

PSY 4290 Psychology of Women (3 q.h.)
Examination of women, historically and in contemporary life, including their social roles and their behavior as determined genetically, physiologically, and psychologically. Includes discussion on the implications for women's future lifestyles, roles, and contributions. *Prereq.* PSY 4111 or PSY 4112 or *equiv.*

PSY 4351 Physiological Psychology 1 (3 q.h.)
Introduction to how nerves function and work together in the nervous system; how our sense organs provide the brain with information about the outside world; how the brain acts to produce behavior; and how such psychological concepts as perception, learning, motivation, arousal, and emotion may relate to nervous system activity. *Prereq.* PSY 4111 or PSY 4112 or *equiv.*

PSY 4352 Drugs and Behavior (3 q.h.)
Application of quantitative behavior techniques in animals and humans to determine the behavioral effects of pharmacological agents. Includes systematic survey of experimental literature. *Prereq.* PSY 4111 or PSY 4112 or *equiv.*

PSY 4370 Impact of Psychology on Society (3 q.h.)
Topics include developments such as the uses of intelligence and aptitude tests, psychosurgery and electroconvulsive therapy, techniques of behavior modification and control, minority and women's rights movements, direct brain stimulation by implanted electrodes, use of psychoactive drugs, use of the lie detector, and the application of experimental techniques to human beings. *Prereq.* PSY 4111 or *equiv.*

PSY 4372 Abnormal Psychology 1 (3 q.h.)
Introduction to the etiology and dynamics of the abnormal personality. *Prereq. PSY 4112 or equiv.*

PSY 4373 Abnormal Psychology 2 (3 q.h.)
Symptomatology and treatment of the neuroses and psychoses. *Prereq. 4372 or equiv.*

PSY 4374 Abnormal Psychology 3 (3 q.h.)
Explores psychosomatic, psychopathic, and organic disorders; varieties of psychotherapy. *Prereq. PSY 4373 or equiv.*

PSY 4381 Sensation and Perception 1 (3 q.h.)
Introduction to the nature of the perceptual world, the nature of object recognition and identification, spatial organization, contextual effects, learning and perception, and the influence of attitudinal, motivational, and personality factors on perception. *Prereq. PSY 4111 or equiv.*

PSY 4390 Industrial Psychology 1 (3 q.h.)
Examines psychology as applied to industry, including such topics as selection and placement procedures, employee assessment, individual differences and their evaluation, and the place of psychological tests in industry. *Prereq. PSY 4111 or PSY 4112 or equiv.*

PSY 4391 Industrial Psychology 2 (3 q.h.)
Covers personnel training and development, motivation and work, attitudes and job satisfaction, engineering psychology, and human factors in accident causation. *Prereq. PSY 4390 or equiv.*

PSY 4392 Industrial Psychology 3 (3 q.h.)
Discusses supervision and leadership, morale, personnel counseling, the psychology of labor-management relations, human relations, and organizational behavior. *Prereq. PSY 4391.*

PSY 4471 Psychological Therapies (3 q.h.)
Studies techniques used for treating deviant behavior, from classical psychoanalytical therapies through methods of behavior modification. *Prereq. PSY 4374 or equiv.*

PSY 4561 Experimental Psychology 1 (3 q.h.)
Students conduct experiments focusing on the scientific method in the design,

execution, analysis, and reporting of psychological investigations. *Prereq. PSY 4222.*

PSY 4562 Experimental Psychology 2 (3 q.h.)
Continuation of PSY 4561. *Prereq. PSY 4561.*

PSY 4563 Experimental Psychology 3 (3 q.h.)
Continuation of PSY 4562. *Prereq. PSY 4562.*

PSY 4611 Senior Seminar in Psychology (3 q.h.)
Small groups of students meet to discuss topics of mutual interest in psychology. Each seminar has a different focus, depending upon the student group and the instructor. *Prereq. senior status or instructor's permission.*

PSY 4813 Field Work in Psychology (6 q.h.)
Designed to enhance career development by allowing students to earn credit for the application of their academic backgrounds to practical problems in the work place. See page 21 for details.

PSY 4815 Advanced Tutorial 1 (3 q.h.)
Opportunity to take an upper-level course independently. See page 21 for details. *Prereq. 87 q.h.*

PSY 4816 Advanced Tutorial 2 (3 q.h.)
See PSY 4815.

PSY 4820 Independent Study 1 (3 q.h.)
Opportunity to undertake special research. See page 21 for details. *Prereq. 96 q.h., 3.0 q.p.a.*

PSY 4821 Independent Study 2 (3 q.h.)
See PSY 4820.

PSY 4822 Independent Study 3 (3 q.h.)
See PSY 4820.

PSY 4891 Honors Program 1 (4 q.h.)
Opportunity to undertake an in-depth research study project. See page 21 for details. *Prereq. 96 q.h., 3.5 q.p.a.*

PSY 4892 Honors Program 2 (4 q.h.)
See PSY 4891.

PSY 4893 Honors Program 3 (4 q.h.)
See PSY 4891.

PSY 5242 Development: Adulthood and Aging (3 CEUs)
Same as PSY 4242.

PSY 5243 Aging and Mental Health (3 CEUs)
Same as PSY 4243.

PURCHASING

PUR 4351 Purchasing 1 (3 q.h.)

Introduction to the function of purchasing in the industrial organization. Includes purchasing responsibilities, objectives, organization, and personnel requirements; purchasing policy and systems; the role of the computer in regulating purchasing planning, transactions, and information retrieval; acquisition of purchased materials, development of sources of supply, and quality assurance; and determination and maintenance of required inventory levels. Also covers control of inventory investment, price determination, cost and price analysis of purchase transactions, make or buy decisions, and the role of standardization and value analysis.

PUR 4352 Purchasing 2 (3 q.h.)

The process of purchase negotiations, budgets, and purchase of capital equipment is examined. Includes purchasing for public and nonprofit institutions, disposition of surplus and obsolete materials, traffic and material handling, forward buying and speculation, ethical considerations in purchasing, purchasing law, contract cancellations, purchasing reports, evaluation of purchasing performance, and control and audit procedures. *Prereq.* PUR 4351.

PUR 4353 Purchasing (Intensive) (6 q.h.)

Same as PUR 4351 and PUR 4352.

PUR 4357 Business Negotiations (3 q.h.)

Explores buyer-seller communication and exchange. Includes the interactive process for arriving at a satisfactory agreement between buyer and prospective vendor and accepted strategies employed by both parties. Discusses economic and technical considerations and the psychological and interpersonal environments of negotiations. *Prereq.* PUR 4351.

PUR 4358 Materials Requirements Planning (3 q.h.)

Includes determination of material requirements based on the master production schedule; as well as calculation of the time periods in which materials must be available. The computer-based MRP system may be

used as preparation for APICS certification exams.

PUR 4365 Production Activity Control (3 q.h.)

Topics include principles, approaches, and techniques used to plan, schedule, control, and evaluate the effectiveness of factory production operations. Examines scheduling and control techniques used in various manufacturing environments. Course may be used as preparation for APICS Certification examinations.

PUR 4370 Inventory Management (3 q.h.)

Explores basic inventory management objectives, from the control of raw materials to finished goods and distribution inventory management. Includes aggregate inventory controls, lot sizing, customer service objectives, and the financial and physical controls necessary for effective inventory management. Course may be used as preparation for APICS Certification examinations.

PUR 4390 Just-In-Time Manufacturing (JIT) (3 q.h.)

Just-In-Time manufacturing is a natural evolution of traditional practices which strives towards increasing through-puts, decreasing inventory investments, decreasing operating expenses, improving quality, etc. This course has been developed to introduce the student to the philosophies, principles, concepts, and techniques of Just-In-Time purchasing and manufacturing. Emphasis on the differences between traditional and J.I.T. manufacturing will be discussed in detail. This course will also help the student to prepare for the APICS Just-In-Time certification examination.

PUR 4395 Master Production Scheduling (MPS) (3 q.h.)

This course is divided into two sections: Forecasting and Master Production Scheduling. The Forecasting/Section develops the concept of Forecasting; qualitative, intrinsic and extrinsic techniques, Forecast source data, Forecast accuracy, statistics, the relation of Forecasting to other processes and Management Considerations. The

Master Production Scheduling Section develops the concepts of Master Scheduling Planning and Control, development and utilization of a Master Production Scheduler. Finally, the course discusses the link between Forecasting, the Master Production Schedule and Customer Orders. This course can be used for preparation for the APICS certification examination.

PUR 4600 Honors Program 1 (4 q.h.)

Opportunity to undertake an in-depth research study project. See page 21 for details. *Prereq.* 96 q.h., 3.5 q.pa.

PUR 4601 Honors Program 2 (4 q.h.)

See PUR 4600.

PUR 4602 Honors Program 3 (4 q.h.)

See PUR 4600.

PUR 4701 Independent Study 1 (3 q.h.)

Opportunity to undertake special

research. See page 21 for details.

Prereq. 96 q.h., 3.0 q.pa.

PUR 4702 Independent Study 2 (3 q.h.)

See PUR 4701.

PUR 4703 Independent Study 3 (3 q.h.)

See PUR 4701.

PUR 4800 Advanced Tutorial 1 (3 q.h.)

Opportunity to take upper-level course independently. See page 21 for details.

Prereq. 87 q.h.

PUR 4801 Advanced Tutorial 2 (3 q.h.)

See PUR 4800.

PUR 4900 Field Work (6 q.h.)

Opportunity to enhance career development by applying academic background to practical problems in the workplace. See page 21 for details. *Prereq.* Approval of Program Director.

RADIOLOGIC TECHNOLOGY

RAD 4100 Radiologic Technology

Orientation 1 (3 q.h.)

Examines history of X-radiation, radiology department organization, medical terminology, patient care and nursing procedures, and contrast media.

RAD 4101 Radiologic Technology

Orientation 2 (3 q.h.)

Study of medical and surgical diseases.

Prereq. RAD 4100.

RAD 4102 Radiologic Science 1 (4 q.h.)

Basic concepts of physics, units of measurement, Newton's law of motion, work, energy, atomic theory of matter, electric currents, magnetism, generators, motor production, control of high voltage, and X-ray production are covered. *Prereq.* MTH 4110.

RAD 4103 Radiologic Science 2 (4 q.h.)

Topics include interaction of X-rays and matter; modern X-ray tubes; X-ray circuits; simulator experiments; fluoroscopic systems; and properties of solids, liquids, and gases. Also covers temperature and heat transfer and their application. *Prereq.* RAD 4102.

RAD 4104 Principles of Radiology 1 (4 q.h.)

Practical, basic radiation protection and the principles of positioning patients for radiographic studies are covered. *Prereq.* RAD 4114.

RAD 4105 Principles of Radiology 2 (4 q.h.)

Explores principles of precise body positioning for detailed radiographic studies. *Prereq.* RAD 4104.

RAD 4106 Radiologic Photography and Exposure 1 (4 q.h.)

Emphasizes basic principles of image formation, electromagnetic spectrum, X-ray tube construction, and factors controlling radiographic quality. *Prereq.* RAD 4103 and MTH 4110 or equiv.

RAD 4107 Radiologic Photography and Exposure 2 (4 q.h.)

Examines mathematical formulas used in radiography. Includes in-depth study of sensitometry, phototiming principles, tomography, and radiographic film techniques. *Prereq.* RAD 4102 and RAD 4106.

RAD 4116 Radiology Practicum 1 (4 q.h.)

Students apply theoretical principles by performing radiographic procedures under supervision in a direct patient care setting. Requires four hours of classroom education and assigned homework. Emphasizes patient safety, radiation protection, and basic, routine diagnostic procedures.

RAD 4117 Radiology Practicum 2 (4 q.h.)

Continuation of RAD 4116. Emphasizes routine diagnostic procedures,

including fluoroscopy, operating room and portable radiography. *Prereq.* RAD 4116.

RAD 4118 Radiology Practicum 3 (4 q.h.)

Continuation of RAD 4117. Emphasizes advanced diagnostic procedures, including invasive and interventional studies. Minor rotations are scheduled for related imaging departments. *Prereq.* RAD 4117.

RAD 4119 Radiology Practicum 4 (4 q.h.)

Continuation of RAD 4118. Final clinical practicum leads to demonstration of accomplishment of terminal clinical competencies. *Prereq.* RAD 4118.

RAD 4121 Principles of Photography and Exposure Lab 1 (1 q.h.)

Energized x-ray laboratory activities designed to complement RAD 4106.

RAD 4122 Principles of Photography and Exposure Lab 2 (1 q.h.)

Continuation of RAD 4121. Designed to complement RAD 4107.

RAD 4304 Cross-Sectional Anatomy (4 q.h.)

Introduces regional approach to anatomy. Reviews standard anatomy, with emphasis on relations of organs and structures to transverse and longitudinal section appearance.

RAD 4305 Advanced Radiologic Technology (4 q.h.)

Special procedures including cardiovascular procedures, neuroradiology, lymphangiography, and intervention studies are explored. Exam methodology, required equipment, special patient care, contrast media, and contra indications are also covered. *Prereq.* RAD 4103, RAD 4105, RAD 4107.

RAD 4306 Radiation Protection—Radiobiology (4 q.h.)

Topics include atomic structure, properties of radioactive materials, units of radiation, long- and short-term biological effects, life span shortening, radiation detection and survey instruments, radiographic facilities design, reduction of exposure to patients, federal x-ray standards, and radiopharmaceuticals. *Prereq.* RAD 4107.

RAD 4400 Anatomy of the Head and Neck (3 q.h.)

Explores anatomy of the head and neck in regional approach. Both standard and sectional anatomy are presented. Topics include brain, orbits, nasal cavity and paranasal sinuses, oral cavity and pharynx, larynx, thyroid and salivary glands, and angiology of head and neck.

RAD 4450 Computerized Body Tomography Pathology (3 q.h.)

Studies abnormal anatomy of the neck, thorax, abdomen, and pelvis as demonstrated by computed tomography. Appropriate correlations made to normal anatomic structure. *Prereq.* RAD 4304 or consent of instructor.

RAD 4460 Medical Imaging Quality Assurance (3 q.h.)

Establishing, conducting, and interpreting the results of a medical imaging quality assurance program are discussed. Covers basic imaging chain, film characteristics and sensitometry, test equipment and operation, data collection and interpretation. *Prereq.* RAD 4305 or equiv.

REAL ESTATE

RE 4301 Real Estate Fundamentals 1 (3 q.h.)

Introduction to the basic principles and terminology of real estate useful in various real estate business practices.

RE 4302 Real Estate Fundamentals 2 (3 q.h.)

Examine practices of real estate brokerage, including real estate appraisal, finance, development, management, and investment. Upon successful completion of RE 4301 and RE 4302,

students may take the Massachusetts broker's or salesperson's examination. *Prereq.* RE 4301.

RE 4303 Real Estate Fundamentals (Intensive) (6 q.h.)

Same as RE 4301 and RE 4302.

RE 4304 Real Estate Fundamentals (Brokers) (4 q.h.)

Reviews the general principles and practices of real estate fundamentals. General principles are examined with

specific attention given to those areas of real estate that are tested on the Massachusetts broker's real estate examination. On successfully completing RE 4304, students are certified, which enables them to take the Massachusetts broker's exam. *Prereq. RE 4302 or permission of instructor.*

RE 4305 Real Estate Title Examination
(3 q.h.)

Review of the general principles of abstracting and the function of the Registry of Deeds in the real estate business. General principles of title examinations are explored in detail, with attention given to recording deeds and the transfer of title in the conveyance of real estate. The function of the land court and registered land is also treated. Prepares the students for a possible career in title examination and may require field work in the form of activities to be performed at the Registry of Deeds.

RE 4323 Real Estate Appraisal 1 (3 q.h.)
Fundamental survey of the appraisal of single-family residences. Examines city or town neighborhood influences, site evaluation, building diagnosis, depreciation, the various approaches to value, and appraisal report preparation. *Prereq. RE 4302.*

RE 4324 Real Estate Appraisal 2 (3 q.h.)
Specialized overview of the appraisal of income properties. Includes application of the cost, market, and income approaches to apartment buildings and other commercial and industrial properties and of the various methods of capitalization and residual techniques. *Prereq. RE 4323.*

RE 4326 Appraising a Single-Family Dwelling (3 q.h.)

Fundamental survey of the appraisal of single-family dwellings for the beginning appraiser, real estate broker, salesperson, lender, assessor, or builder. Includes city and neighborhood analysis, site evaluation, building materials and cost, and depreciation. Also includes selected research into appropriate market data, assembling pertinent information, applying relevant analytical techniques,

and preparing appraisal reports, including FNMA/FMAC report forms.

RE 4327 Real Estate and Computer Analysis
(3 q.h.)

This practical, step-by-step approach to the use of computers in the real estate business is strongly recommended for those students who plan on taking Real Estate Appraisal II and is required for those students taking either Real Estate Financial Analysis I or Financial Analysis II. The course involves a detailed analysis of computers in the financing of income properties. Students will be required to purchase a hand-held state of the art computer with a solution workbook, the combined cost of which will be less than \$100. The computer will allow the students to examine and analyze proposed real estate investments and complicated appraisal assignments. *Prereq. RE 4302 or permission of instructor.*

RE 4328 Real Estate Financial Analysis 1 (3 q.h.)

Analysis of how to critically examine and analyze any proposed real estate investment. Explores in detail the financial aspects of acquisition, ownership, and disposition, and considers taxation of investments, forms of property ownership (organization of the venture), analysis of operating statements, financial accounting, use of leverage, "tax-sheltered" investments, and special situations. Develops criteria of risk and return on investment (ROI) that should be established by various types of investors. Spreadsheets utilized. *Prereq. RE 4324 or instructor's permission.*

RE 4329 Real Estate Financial Analysis 2
(3 q.h.)

Detailed analysis of the risks and rewards of real estate investments and problems involved in financing income properties, using case studies, homework problems, and class discussion and debate. Stresses class participation. *Prereq. RE 4328.*

RE 4330 Real Estate Financial Analysis (Intensive) (6 q.h.)

Same as RE 4328 and RE 4329. *Prereq. RE 4324.*

RE 4340 Real Estate Development (3 q.h.)
 Practical, step-by-step approach to the organization and development of a real estate project for the entrepreneur, banker, or broker. Includes the role of the developer, acquisition of land, site analysis, construction finance, gap financing and permanent commitments, project budgeting for capital costs and for income and expense, selection of professionals, negotiations of agreements with contractors and owners, and marketing the completed project. Case studies and guest lecturers may be featured. *Prereq.* RE 4329 or instructor's permission.

RE 4341 Real Estate Law 1 (3 q.h.)
 Covers private real estate law, including ownership rights in land, leasehold rights, and easements in the land of another; legal forms of ownership; the transfer and acquisition of title and of other interests; recording of deeds, leases, and other instruments; and the landlord-tenant relationship.

RE 4342 Real Estate Law 2 (3 q.h.)
 Includes topics such as public real estate law, including government powers, rights, and controls on privately owned real estate; zoning and subdivision controls; conservation controls; taxation of real estate; rent controls; and eminent domain. *Prereq.* RE 4341.

RE 4344 Real Estate Management 1 (3 q.h.)
 Prepares students for the practical problems of real estate management. Stresses the requisite day-to-day management of commercial, industrial, and residential properties as well as the need for a management

strategy relating to long-term property values. *Prereq.* RE 4302 or instructor's permission.

RE 4345 Real Estate Management 2 (3 q.h.)
 Continuation of RE 4344. *Prereq.* RE 4344.

RE 4346 Real Estate Management 3 (3 q.h.)
 Continuation of RE 4345. *Prereq.* RE 4345.

RE 4600 Honors Program 1 (4 q.h.)
 Opportunity to undertake an in-depth research study project. See page 21 for details. *Prereq.* 96 q.h., 3.5 q.p.a.

RE 4601 Honors Program 2 (4 q.h.)
 See RE 4600.

RE 4602 Honors Program 3 (4 q.h.)
 See RE 4600.

RE 4701 Independent Study 1 (3 q.h.)
 Opportunity to undertake special research. See page 21 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

RE 4702 Independent Study 2 (3 q.h.)
 See RE 4701.

RE 4702 Independent Study 3 (3 q.h.)
 See RE 4701.

RE 4800 Advanced Tutorial 1 (3 q.h.)
 Opportunity to take upper-level course independently. See page 21 for details. *Prereq.* 87 q.h.

RE 4801 Advanced Tutorial 2 (3 q.h.)
 See RE 4800.

RE 4900 Field Work (6 q.h.)
 Opportunity to enhance career development by applying academic background to practical problems in the workplace. See page 21 for details. *Prereq.* Approval of Program Director.

REC 4101 Principles and Practices of Therapeutic Recreation 1 (3 q.h.)
 Overview of the field, including rationale, history, philosophy, goals, treatment settings, problems of institutionalization, adjunctive therapies, and professional development.

REC 4102 Principles and Practices of Therapeutic Recreation 2 (3 q.h.)
 Basic medical terminology with an overview of traumatic, sensory, neurological, orthopedic, and

cardiovascular disabilities. Also includes prosthetics, orthotics, and an examination of attitudinal and societal barriers for the handicapped. *Prereq.* REC 4101 or consultant's permission.

REC 4103 Principles and Practices of Therapeutic Recreation 3 (3 q.h.)
 Integrated case-method and systems approach to planning with individuals and groups. Focus is on assessment; quality assurance; designing, charting, and understanding the fundamental

THERAPEUTIC RECREATION

elements of activities; current legislation; and standards of service. *Prereq.* REC 4102.

REC 4105 Childhood Medical Procedures (2 q.h.)

Explores emergency care/first aid and medical procedures for infants, children and adolescents who are in the care of professional parents in group homes, foster homes and day care facilities based on the practices of the American Red Cross and Standard of Care by Pediatricians. Prevention will be a major focus.

REC 4110 Group Dynamics and Leadership 1 (3 q.h.)

Emphasis on self-awareness, identity, and interpersonal and intergroup communications. Includes process factors influencing the need to join the group; motivation to participate; membership screening; size and purpose of the group; open-ended and closed approaches; group problem solving; brainstorming; and conflict resolution.

REC 4111 Group Dynamics and Leadership 2 (3 q.h.)

Discussion of organization, development, and structure of groups; team building; role and value clarification; ramifications of change; group characteristics; and leadership styles and techniques. *Prereq.* REC 4110.

REC 4112 Group Dynamics and Leadership (Intensive) (6 q.h.)

Same as REC 4110 and REC 4111.

REC 4118 Coping Skills for Child Rearing (2 q.h.)

A basic introduction to understanding coping skills for those in a parenting role. A primary focus of this course is to introduce cognitive, behavioral, emotional and environmental changes. Life style changes as well as various relaxation techniques will be presented.

REC 4200 Introduction to Learning Disabilities (3 q.h.)

Review of the behavioral characteristics of people with deficits in perceptual, integrative, or expressive processes that impair learning. Appropriate curricula and teaching methods surveyed.

REC 4210 Psychosocial Aspects of Disabilities and Illness (3 q.h.)

Exploration of issues and attitudes related to disability, such as societal understanding, handicapping conditions, adjustments, social networks, coping, and the interaction of care providers with the disabled.

REC 4215 Causes/Detection of Child Abuse (3 q.h.)

Introduction to the causes of abuse in individuals and in society. Detailed description/definitions of domestic violence, child abuse, neglect and sexual abuse. Assessing treatment services and intervention strategies are introduced.

REC 4250 Assessment of Learning Disabilities (3 q.h.)

Presentation of the formal and informal assessment procedures for general, specific, and behavioral learning deficits. Techniques for the remediation of these deficits in schools and home are reviewed. *Prereq.* REC 4200.

REC 4300 Arts and Crafts 1 (3 q.h.)

Overview of the creative media available for individual projects. Includes how to develop the technical capability to use a wide variety of materials in imaginative ways and the compilation of a personal arts and crafts manual as a reference tool.

REC 4301 Arts and Crafts 2 (3 q.h.)

Adaptation of creative skills to a therapeutic setting. Emphasizes continued development of technical capabilities and of instructional skills (one-to-one and group). Also discusses the planning, implementation, and integration of craft programs.

REC 4302 Arts and Crafts (Intensive) (6 q.h.)

Same as REC 4300 and REC 4301.

REC 4304 Dynamics of Family Life for the Disabled (3 q.h.)

Surveys the internal and external dynamics of family life. The significance of these factors to the mental health of the disabled is explored. Approaches to working with families is reviewed, as well as the effects of disabilities on the family unit itself.

REC 4310 Social Recreation (3 q.h.)

Planning, organizing, and motivating for social recreation activities, including ice breakers, mixers, active and inactive games, joint projects, and special events geared to a variety of settings.

REC 4311 Therapeutic Use of Music 1

(3 q.h.)

Introduction to the field of music therapy, including an exploration of historical and current theories and various techniques used in clinical settings. Also includes a survey of the literature of therapy, covering special education and psychiatric and geriatric areas. Not open to students who have taken MUS 4160 or MUS 4161.

REC 4314 Therapeutic Use of Music 2

(3 q.h.)

This course continues the exploration of the principles and practices of the therapeutic uses of music. It allows the student to use theoretic knowledge to create music therapy activities for a variety of client populations with an emphasis on psychiatric and geriatric care. Formerly MUS 4161. *Prereq.*

REC 4311.

REC 4350 Legal Issues of Disability and Rehabilitation (3 q.h.)

An analysis of significant legal issues pertaining to rehabilitation and disability in education, employment, and housing. Pertinent federal and state statutes covered.

REC 4378 Parenting Skills 1 (3 q.h.)

Designed for both experienced and prospective parents/caregivers. It will reinforce and enhance methods that parents/caregivers have already developed to deal effectively with child caring situations. For those who feel less confident about their ability or experience, it will point out the way to an effective, consistent, philosophical approach.

REC 4379 Parenting Skills 2 (3 q.h.)

Designed to help parents/caregivers understand and differentiate between psychotic and neurotic behaviors, as well as to identify the symptoms of the unattached child. Specific techniques will be taught that will help the

caregiver work successfully with the child, and in the case of the severely disturbed child, to be able to work as part of a therapeutic team in a treatment plan.

REC 4380 Parenting Skills (Intensive)

(6 q.h.)

Same as REC 4378 and REC 4379.

REC 4401 The Nursing Home Experience

(3 q.h.)

Exchange of empirical data relating to case experiences and institutional procedures encountered by activity leaders and other practitioners in nursing homes. Examines the feasibility of functional innovations in relation to present practices.

REC 4402 Leisure and Lifestyle (3 q.h.)

Focus on aspects contributing to life styles and the role of leisure. Examines specific lifestyles through reading and video-taped materials. Gives students the opportunity to examine the impact of leisure on their own lifestyles and future aspirations.

REC 4403 Concepts of Leisure: Sociopsychological Perspectives (3 q.h.)

Explores the various sociopsychological perspectives of leisure and the relations on mores, social structure, roles and values, and personality to leisure expression. Investigates other pertinent social and environmental factors that contribute to the phenomena of leisure.

REC 4405 Management in Handicapped Residences (3 q.h.)

Designed to provide students with both theoretical and practical applications of management and leisure services on a community residence related to a population of mentally handicapped persons. Emphasis on management techniques and skills, appropriate leisure service planning and implementation, and direct work with both clients and staff in a community residence.

REC 4425 Mental Illness and Retardation

(3 q.h.)

Origins and manifestations of mental illness and retardation are discussed. Historical and contemporary overviews

include discussions of treatment, settings, case studies, and trends.

REC 4450 Vocational Planning for the Learning Disabled (3 q.h.)

Survey of the issues and processes that need to be taken into consideration when assisting the learning disabled in making vocational choices.

Resources available for placement and training are covered, as well as how to design a skill assessment and interest inventory. The ultimate aim is to assist the client in the process of self-assessment, goal-setting, and the job search process.

REC 4460 The Process of Aging (3 q.h.)

Psychosocial dynamics of growing old, physical changes as a result of aging, the needs of people as they age, and attitudes toward work, retirement, and leisure are discussed. A study of dependency versus independence, remotivation, death and dying, and programs and services that add quality to the long life.

REC 4462 Leisure Counseling (3 q.h.)

Remedial and developmental process designed to produce behavior and attitude changes in the client's leisure patterns. Includes development of competence in identifying, using, and referral to appropriate recreational resources. Compares leisure counseling fundamentals in a variety of recreational settings.

REC 4470 The Learning Disabled at Work (3 q.h.)

Examination of the learning disabled in the workplace, how their performance

may be impacted, and what accommodations in job content may be necessary. The aim is to develop problem-solving strategies that facilitate the positive contributions a learning disabled person can make with some accommodations.

REC 4500 Clinical Internship 1 (4 q.h.)

Assigned field experience in a treatment facility under supervision of a qualified professional. Students have the opportunity to learn about the direct service application of classroom theory through observation and participation and written reports, evaluations, and seminars. *Prereq.* REC 4103 plus 12 q.h. of professional courses and consultant's permission.

REC 4501 Clinical Internship 2 (4 q.h.)

Continuation of REC 4500. *Prereq.* REC 4500.

REC 4502 Clinical Internship (Intensive) (8 q.h.)

Assigned clinical internship in a facility under the supervision of a certified Therapeutic Recreator (CTRS) professional. This clinical experience averages 36-40 hours per week for a minimum of 10 consecutive weeks at one agency totalling a minimum of 360 hours. This course meets the certifying requirement of the National Park and Recreation Association Certifying Board for the Therapeutic Recreator. *Prereq.* REC 4103 plus 12 q.h. of professional courses and/or the consultants permission.

**SOCIOLOGY-
ANTHROPOLOGY**

SOA 4100 Physical Anthropology (3 q.h.)

Introduction to elements of physical anthropology, covering such subjects as primates, fossil humans and evolution, problems of heredity and genetics, race and racial classifications. *Not open to students who have credit for SOC 4010.*

SOA 4101 Cultural Anthropology: Kinship Societies (formerly Preliterate Societies) (3 q.h.)

Introduction to sociocultural anthropology through the study of societies that have been called "tribal" or

"primitive." Examines a range of contemporary societies that have no class structures, their social and cultural institutions, their subsistence strategies, and their efforts to remain independent people today.

SOA 4102 Cultural Anthropology: State Societies (formerly Industrial Societies) (3 q.h.)

Examines the social relations and cultural dynamics in peasant societies. Discusses the transformation of peasants into workers and the patterns of industrialization in the post-colonial

world. Addresses issues of cultural diversity and social stratification in industrial societies.

SOA 4103 Anthropology Intensive A (6 q.h.)
Same as SOA 4100 and SOA 4101.

SOA 4104 Anthropology Intensive B (formerly Anthropology Intensive) (9 q.h.)
Same as SOA 4100, SOA 4101, and SOA 4102.

SOA 4146 Peasant Societies in a Changing World (3 q.h.)

Examines changes affecting traditional peasant cultures in the non-Western and Western worlds. Includes the processes occurring in situations involving culture contact, conquest, and colonialism.

SOA 4155 Individual and Culture (3 q.h.)
Focuses on cross-cultural comparisons of the socialization and acculturation of children and adults with respect to roles, values, and personality. Examines theories and methods used in psychological anthropology.

SOA 4160 Sex, Sex Roles, and the Family (3 q.h.)

Analyze popular and scientific notions about sex and the family by examining the social patterning of interactions in our culture, other cultures, and other species. Emphasizes the changing relationships between men and women.

SOA 4221 Culture and Medicine (3 q.h.)
Perspectives on medicine and health care are rapidly changing. As costs skyrocket, alternatives to "curative" medicine are being sought. Uses an anthropological perspective and draws on the vast amount of cross-cultural literature in exploring the impact of sociocultural factors on the incidence, definition, treatment, and prevention of illness as well as the organization of health services.

SOA 4266 Folklore (3 q.h.)

Focus on Folklore, art, and song in various societies and how they are studied. Examines contemporary American materials.

SOA 4322 Culture Theory (3 q.h.)

What is culture? How do we explain cultural phenomena, including culture change? This course examines different classical and contemporary theories of culture: Boasian, functionalist, structuralist, marxist, post-structuralist, and postmodernist.

SOA 4430 Native North American Peoples (3 q.h.)

Past and present circumstances of a number of native North American peoples are explored.

SOA 4431 African Peoples and Cultures (3 q.h.)

Topics include African geography, prehistory, and culture; the spectrum of societal complexity ranging from Mbuti egalitarianism to Ashanti federation; and the problems of political, economic, and social change in contemporary Africa.

SOA 4434 Latin American Peoples and Cultures (3 q.h.)

Explores the processes of socioeconomic and cultural change in Latin America. Examines a selection of precolonial, colonial, and contemporary societies. For contemporary societies, the focus is on the relationship of local communities (peasant, worker, ethnic) to national cultures and global political and economic structures.

SOA 4470 Religion in Cross-Cultural Perspective (3 q.h.)

Comparative analysis of the rituals, beliefs, and religious institutions of various groups.

only. Not open to students who have credit for SOC 4100 or SOC 4101.

SOC 4011 Principles of Sociology 2 (4 q.h.)
Continuation of SOC 4010. Emphasizes critical analysis of American society with particular attention to problems of social, political, urban,

SOC 4010 Principles of Sociology 1 (4 q.h.)

Introduction to basic concepts and theories relating to the study of people as participants in group life. Emphasizes socialization, culture, social structure, primary groups, family, social stratification, and population.
For Alternative Freshman-Year students

SOCIOLOGY

and industrial change. *For Alternative Freshman-Year students only. Not open to students who have credit for SOC 4101 or SOC 4102. Prereq. SOC 4010 or equiv.*

SOC 4100 Roles, Culture, and the Individual (formerly Fundamental Issues in Sociology) (3 q.h.)

Examines basic theoretical perspectives, research methods, and concepts of sociology, including society, status and role, socialization, and social groups. *Not open to students who have credit for SOC 4010.*

SOC 4101 Inequality and Institutions (formerly The Individual and Social Roles) (3 q.h.)

Examines how an individual's experience in society is shaped by cultural institutions and beliefs, and structures of interaction. Topics include patterns of deviance (crime, drugs), gender roles, and sexuality.

SOC 4102 Institutions and Social Change (formerly Critical Issues Facing Society) (3 q.h.)

Examines important social factors, including business and industry, population and ecology, science and technology, class, and race and ethnic relations. *Not open to students who have credit for SOC 4011. Prereq. SOC 4100 or equiv.*

SOC 4103 Introduction to Sociology Intensive A (formerly Sociology Intensive) (9 q.h.)

Same as SOC 4100, SOC 4101, and SOC 4102.

SOC 4104 Introduction to Sociology Intensive B (6 q.h.)

Same as SOC 4100 and SOC 4101.

SOC 4120 Sociology of Boston (3 q.h.)

The city is a laboratory for exploring the people's search for a lifestyle and the satisfaction of their needs. The city of Boston from the perspectives of environmental development, neighborhood and intergroup relations, institutional services, and symbolic meanings. Includes field trips with workbook and requires use of documentary and literary sources for term paper report. *Does not meet elective requirements for Sociology-Anthropology major.*

SOC 4125 Social Problems (3 q.h.)

Contemporary American social problems and the application of sociological concepts, methods, and principles to these problems are explored.

SOC 4147 Urban Sociology (3 q.h.)

Topics include various causes, characteristics, and effects of urbanization in several different cultures. Gives specific attention to the problem of urban and suburban living and the changing structure of the city.

SOC 4154 Sex and Gender Roles in Society (formerly Sex in Society: The Study of Sex Roles) (3 q.h.)

Explores historical and contemporary developments, examining the ways in which men's and women's changing roles are related to society at large.

SOC 4155 Sociology of the Family (formerly Sociology of the Family 1) (3 q.h.)

Studies the family as a social institution in several selected cultures; family interrelations with political, economic, and educational institutions; and the changing nature of the family.

SOC 4156 Violence in the Family (formerly Sociology of the Family 2) (3 q.h.)

Examines physical, emotional, and sexual violence that occurs in families, emphasizing child and spouse abuse. Analyzes definitions, prevalence, causes, prevention, and treatment of specific cases of violence. Primary focus is on social and policy issues and problems of legal intervention.

SOC 4170 Race and Ethnic Relations (3 q.h.)

Focuses on relationships among various racial, national, cultural, and religious groups, emphasizing the development of black-white relationships in American society. Also covers the problems of contemporary minority peoples in American and other societies.

SOC 4175 Sociology of Work (3 q.h.)

Explores the world of work, focusing on the development of occupational cultures, the nature of careers, and the meanings and implications of professionalization. Students are encouraged to do a project on a career they are considering or one in which they have had practical experience on co-op.

SOC 4176 Business and Industrial Sociology (3 q.h.)

Examines role of industry in modern society. Covers similarities and dissimilarities among industrial societies, bureaucracy and its alternatives, unions, supervision democracy and manipulation, the individual on the assembly line, sabotage of the organization, and the role of wages and alienation.

SOC 4185 Sociology of Deviant Behavior (3 q.h.)

Topics include a variety of social problems and their relation to the organization of society. Pays particular attention to alcoholism, sexual offenses, drug abuse, mental disorders, and other responses to conditions of urban industrial society.

SOC 4186 Social Control (3 q.h.)

Discusses group membership as a determinant of behavior, including analysis of status and role, patterns of authority, power, and group ideology as factors in the evaluation of conduct.

SOC 4190 Juvenile Delinquency (3 q.h.)

Emphasis on factors involved in juvenile delinquency and their implications for prevention, rehabilitation, and treatment.

SOC 4195 Drugs and Society (3 q.h.)

Introduction to the sociology of drugs. Examines social definitions of drugs, conditions of their use, and socialization into drug use. Considers deviant drug use and effects of social control on definitions and use. A range of licit and illicit drugs is considered.

SOC 4202 Sociology of Drinking (3 q.h.)

Exploration of how different groups and societies organize drinking as a social act, and the consequences of that organization. Covers the cultural meaning assigned to drinking, the social elements found in all drinking situations, how members of social groups learn how to drink, and the social and psychological functions of drinking.

SOC 4205 Law and Society (3 q.h.)

Topics include functions of law in modern society; legislation, litigation, and adjudication as social processes;

the legal profession, the courts, and the administration of justice; laws and judicial decisions on controversial social issues; and laws regulating domestic, industrial, and other major social relationships.

SOC 4215 Medical Sociology (3 q.h.)

Examination of sociological concepts and research relating to patterns of behavior in the areas of health and disease. Emphasizes the family, community, medical organizations, class, and status as social subsystems related to the field of health.

SOC 4220 Sociology of Mental Health (3 q.h.)

Covers sociological aspects of mental health and mental disorder. Examines the social history of mental illness, epidemiological and cross-cultural approaches to mental disorder, the career of the mental patient, the functions of psychiatry in society, community and social treatment modalities, and social psychiatry.

SOC 4225 Social Gerontology (3 q.h.)

Analyzes issues and questions of aging, with special attention to social and economic consequences of the aging process, such as retirement and productivity, health care problems, nursing home residences, widower- and widowhood, and the approach of death. Gives examples relating to aging in other cultures in a search for new answers to social problems of aging in the United States. Discusses how to anticipate, cope with, and even prevent problems of aging that concern self, family, and clients or patients.

SOC 4226 Work, Leisure, and Aging (3 q.h.)

Includes discussion of theory and practice of leisure time activities as they relate to the older adult. Examines the social, cultural, and economic aspects of work, including housework, and the meaning of leisure. Explores various types of leisure activities and resources as well as how to build skills and design and implement activities.

SOC 4235 Death and Dying (3 q.h.)

Examines the treatment of death and dying, including problems faced by health care professionals, family

members, institutions, the funeral industry, and the dying themselves. Covers cross-cultural perspectives, the social distribution of mortality, the changing nature of death, and the ethical problems in determining life and death with particular attention to such issues as abortion, suicide, and ceasing medical intervention.

SOC 4240 Sociology of Human Service Organizations (3 q.h.)

Explores the contradiction between what human service organizations set out to do and what they actually accomplish. Includes how human service organization goals are defined, how clients become labeled, and the societal constraints placed on clients, workers, and the organizations.

SOC 4241 Human Services Professions (3 q.h.)

Covers human services, viewed from the perspectives of the recipient, the worker, and the society at large. Includes analysis of why they are needed, how agencies and programs have developed, and the basic skills, attitudes, values, and knowledge required of the human service worker today.

SOC 4245 Poverty and Inequality (formerly Sociology of Inequality) (3 q.h.)

Historical analysis of American class and ethnic differences, drawing on comparisons with other countries. Includes critical evaluation of sociological research and theories relating to the causes and effects of poverty and societal responses to it. Suitable for students in applied fields, such as nursing, criminal justice, education, allied health, pre-med, and pre-law.

SOC 4255 Sociology of Sport (3 q.h.)

Topics include games and sport from a sociological perspective, with particular reference to contemporary American society. Includes the role of play in modern society, the social organization of specific games and sports, and the relation of organized sport to the larger society.

SOC 4260 Introduction to Social Work Practice 1 (3 q.h.)

Explores the functions of the helping profession of social work, its settings

and methods. Covers specific techniques, such as interviewing, history taking, and recording skills.

SOC 4261 Introduction to Social Work Practice 2 (3 q.h.)

Continuation of SOC 4260, with particular attention to the functioning of social workers in selected settings. *Prereq. SOC 4260 or equiv.*

SOC 4262 Introduction to Social Work Practice 3 (3 q.h.)

Continuation of SOC 4261. Emphasizes enhancement of practice skills. *Prereq. SOC 4261 or equiv.*

SOC 4276 Popular Culture (3 q.h.)

(formerly Sociology of Popular Culture) Significance of expressions of popular culture, such as film, television, music, and literature is explored. Examines media production, organization, technology, and audience consumption. Also covers the relationship between popular culture and existing socioeconomic institutions.

SOC 4300 Social Theory 1 (3 q.h.)

Historical survey of sociological theorists, including the work of de Tocqueville, Comte, Marx, Durkheim, and Cooley. *Prereq. Instructor's permission or 12 q.h. in Sociology-Anthropology.*

SOC 4301 Social Theory 2 (3 q.h.)

Covers major theoretical issues in sociology. Discussion concentrates on systematic questions and topics rather than on particular theorists, but material is drawn from such theorists as Weber, Simmel, Thomas, Mannheim, Merton, and Parsons. *Prereq. SOC 4300 or equiv.*

SOC 4302 Social Theory 3 (3 q.h.)

Seminar focuses on questions of theoretical interest, such as the problem of order, the problem of change, and the role of the individual in change. Students present papers in class. *Prereq. SOC 4301 or equiv.*

SOC 4303 Social Theory (Intensive) (9 q.h.)

Same as SOC 4300, SOC 4301, and SOC 4302. *Prereq. Instructor's permission or 12 q.h. in Sociology-Anthropology. Not open to students who have credit for SOC 4300, SOC 4301, or SOC 4302.*

SOC 4310 Class, Power, and Social Change (3 q.h.)

Discusses theories of social equality and inequality as applied to the exercise of power and to the growth and development of social movements and group conflict. Takes a large-scale, social-change point of view.

SOC 4331 Social Research Methods 1: Generating and Investigating Research Problems (3 q.h.)

Examines methods for gaining knowledge through social research. Emphasizes the practical aspects of research, such as the problems sociologists face in doing research and how they have been solved. Students are required to design a small study.

SOC 4332 Social Research Methods 2: Tabulating and Analyzing Social Data (3 q.h.)

Covers methods of tabulating, presenting, summarizing, and analyzing data, including elementary descriptive and inferential statistics and how to use them. Emphasizes statistics as a tool and introduces the use of the computer. *Prereq.* SOC 4331 or equiv.

SOC 4333 Social Research Methods 3: Doing Social Research (3 q.h.)

Students carry out the study they designed in SOC 4322, analyze data, and report results. Includes the ethics and politics of social research and the interrelationship of social action, social research, and theory building. *Prereq.* SOC 4332 or equiv.

SOC 4348 Seminar in Urban Studies (3 q.h.)

Interdisciplinary approaches to analyses of urban issues. Includes continuing student projects. *Prereq.* one course in an urban studies field.

SOC 4375 Sociology of Occupations and Professions (3 q.h.)

Topics include social relations within occupational groups; occupational structures; and the institutional aspects of an occupation. Also discusses relationships among supervisors, peers, colleagues, subordinates, and clientele and their significance for work-role behavior.

SOC 4376 Sociology of Industry (3 q.h.)

Comparison of pre-industrial and industrial society, stressing the impact of industry on society and the interrelationship of industry, culture, and values. Also discusses diversification, specialization, human relations, and formal and informal groups.

SOC 4805 Field Work in Sociology (6 q.h.)

Designed to enhance career development by allowing students to earn credit for the application of their academic backgrounds to practical problems in the work place. See page 21 for details. *Prereq.* completion of 15 q.h. in Sociology and Program Director's approval.

SOC 4815 Advanced Tutorial 1 (3 q.h.)

Opportunity to take an upper-level course independently. See page 21 for details. *Prereq.* 87 q.h.

SOC 4816 Advanced Tutorial 2 (3 q.h.)

See SOC 4815.

SOC 4820 Honors Program 1 (4 q.h.)

Opportunity to undertake an in-depth research study project. See page 21 for details. *Prereq.* 96 q.h., 3.5 q.p.a.

SOC 4821 Honors Program 2 (4 q.h.)

See SOC 4820.

SOC 4822 Honors Program 3 (4 q.h.)

See SOC 4820.

SOC 4830 Independent Study 1 (3 q.h.)

Opportunity to undertake special research. See page 21 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

SOC 4831 Independent Study 2 (3 q.h.)

See SOC 4830.

SOC 4832 Independent Study 3 (3 q.h.)

See SOC 4830.

SOC 5225 Social Gerontology (3 CEUs)

Same as SOC 4225.

SOC 5226 Work, Leisure, and Aging (3 CEUs)

Same as SOC 4226.

SOC 5240 Sociology of Human Service Organizations (3 CEUs)

Same as SOC 4240.

SPEECH COMMUNI- CATION

SPC 4001 Speaking Skills for International Students 1 (3 q.h.)

Introductory instruction in pronunciation and intelligibility for formal and informal situations. Monitors communication skills through use of video and audiotape recordings and work in the language laboratory. Following diagnostic testing, students participate in individualized small- and large-group instructional situations. Placement tests are given during the first week of class.

SPC 4002 Speaking Skills for International Students 2 (3 q.h.)

Intermediate-level course designed for persons who have previously studied English, but who need to develop oral communication proficiency. Monitors communication skills through use of video and audiotape recordings and work in the language laboratory. Following diagnostic testing, students participate in individualized small- and large-group instructional situations. Placement tests are given during the first week of class.

SPC 4003 Speaking Skills for International Students 3 (3 q.h.)

Advanced-level course designed for students who have previously studied English and who can make themselves understood easily, but who have difficulty conversing. Includes task-oriented interaction, a variety of two-person communication situations, and small-group interactions. Progress is monitored through use of video and audiotape recordings. Placement tests are given during the first week of class.

SPC 4101 Fundamentals of Human Communication (formerly Effective Communication 1) (3 q.h.)

Introduction to development of personal communication skills, shaping messages, sending messages, listening, understanding nonverbal cues, trusting, giving and receiving feedback, interacting, and coping with the barriers to communication.

SPC 4102 Group Discussion (formerly Effective Communication 2) (3 q.h.)

Topics include small-group communication, elements of group struc-

ture, task and maintenance functions, leadership, and formalized methods of group problem solving and decision making.

SPC 4104 Effective Communication (Intensive) (6 q.h.)

Same as SPC 4101 and SPC 4102.

SPC 4111 Voice and Articulation (3 q.h.)

Development of the speaking voice, with emphasis on articulation, pitch control, and vocal variety and flexibility. Includes basic theory of the vocal mechanism.

SPC 4112 Advanced Voice and Articulation (3 q.h.)

Continuation of SPC 4111. *Prereq.* SPC 4111 or instructor's permission.

SPC 4150 Self-Concept and Communication (3 q.h.)

Examination of the ways communication patterns are formed and how they work in our personal and professional lives. Emphasizes how self-concept affects communication. By combining thinking, feeling, and doing, students can develop awareness of their attitudes and habits and explore alternative communication patterns.

SPC 4151 Listening (3 q.h.)

Analyzes listening effectiveness in professional and personal situations. Reasons for poor listening, techniques for effective listening, and giving and receiving feedback are covered.

SPC 4152 Interviewing (3 q.h.)

Topics include fundamental communication principles and how they apply to the interview process. Gives special attention to employment, information retrieval, and persuasive interviews.

SPC 4153 Techniques of Persuasion (3 q.h.)

Covers communication strategies used when attempting to influence others. Examines instances of persuasion as they occur in advertising, politics, social interaction, sales, and business.

SPC 4154 Negotiation Skills (3 q.h.)

Examination of skills involved in bringing matters to mutually acceptable settlements. Through lectures, discussions, case studies, and

classroom activities, students explore conflict resolution in both personal and professional settings.

SPC 4155 Organizational Communication
(3 q.h.)

An exploration of communication management within organizations. Topics include the role of communication in management, the management and control of information flow, and strategic communication planning.

SPC 4160 Communication and the Media
(3 q.h.)

An overview of the structure, functions, and history of American mass media. Presents a basic understanding of the process of mass media as it intersects society in general, and the lives of individuals in particular.

SPC 4201 Argumentation (3 q.h.)

Basic concepts of argumentation, such as evidence, research, and refutation, with emphasis on the psychology of the audience and various types of group discussion are discussed.

SPC 4221 Interpersonal Communications 1
(3 q.h.)

Examines ways of becoming more aware of one's self and one's relationship to others. Presents options for communicating and for increasing one's knowledge of the group process. Limited enrollment.

SPC 4222 Interpersonal Communications 2
(3 q.h.)

Continuation of SPC 4221. *Prereq.* SPC 4221 or instructor's permission.

SPC 4225 Family Communication (3 q.h.)
Introduction to how communication affects the development and maintenance of family relationships. Topics include marital, parent/child, sibling, and extended family communication patterns; problem identification and problem-solving skills in family communication.

SPC 4231 Female/Male Communication 1
(3 q.h.)

Examines ways in which female/male relations are created, maintained, developed, or dissolved through communication. Covers the influence of family, friends, the media, and "significant others" in sustaining stereotypes

for both sexes and the impact of such stereotyping on the self and on effective communication. Also looks at the use of verbal and nonverbal communication to understand the types of relationships between men and women and how different female/male language styles affect these relations.

SPC 4232 Female/Male Communication 2
(3 q.h.)

Discusses interaction and transactional approaches to analyzing existing relationships. Provides the opportunity to develop skills in diagnosing communication transactions and in developing strategies for effective communication. The influence of supportive and defensive environments and the communication behavior of each are examined and applied to strategies for improving relationships between males and females. *Prereq.* SPC 4231 or instructor's permission.

SPC 4240 Managing Interpersonal Conflict
(3 q.h.)

Basic concepts involved in the management of conflict in interpersonal situations, such as understanding attitudes about conflict, studying message patterns in conflict interactions, and exploring a variety of conflict resolution methods are discussed.

SPC 4241 Professional Selling Skills (3 q.h.)

Provides students with the opportunity to develop an effective sales climate and strategies. Basic concepts involved in the sales process, including referral and nonreferral prospecting, planning, meeting the prospect, assessing the prospect's situation and goals, proposing solutions, dealing with apathy and negativism, closing the sale, and assuring customer satisfaction.

SPC 4251 Business and Professional Speaking (3 q.h.)

Covers practice in the organization and presentation of material to fit varying audiences. Emphasizes delivery techniques and effective presentation of ideas.

SPC 4260 Communication Research Methods
(3 q.h.)

This course provides an overview of the research process and examines various types of research methods as they relate to the study of human communication.

TCC 4030 Word Processing: A Comprehensive Overview (2 q.h.)
(formerly Word Processing for Writers and Editors)

Topics include basic, intermediate, and selected advanced functions of one or more of the most widely-used word processing programs, such as WordStar, MultiMate, or WordPerfect. Minimal typing skills are recommended.

TCC 4050 WordStar (2 q.h.)

Includes composing and writing on a computer screen using Wordstar, the professional text-editing system used by many technical writers, editors, and other publishing professionals. Course provides interpretation of the instruction manual as well as hands-on experience with University-supplied personal computers and software.

TCC 4060 MultiMate (2 q.h.)

Using this powerful, menu-driven word processor with university-supplied hardware, students learn to create, format, and modify various types of documents. Selected advanced functions also covered. Minimal typing skills are recommended.

TCC 4101 Technical Writing 1 (3 q.h.)

Introduction to basic technical writing skills, emphasizing selecting and organizing data. Includes audience analysis, research techniques, and descriptions of objects, mechanisms, and processes. Provides practice in descriptive writing, classification and definition, paragraphing, and preparing technical documentation outlines. Includes frequent technical writing exercises and projects applicable to both software and hardware writing tasks. *A writing proficiency test is given at the first class meeting.*

TCC 4102 Technical Writing 2 (3 q.h.)

Application of the information gathering, organizational, and technical writing skills acquired in TCC 4101 to more advanced projects. Extensive practice in formatting, organizing, writing, and editing technical reports. *Prereq. TCC 4101.*

TCC 4103 Technical Writing (Intensive) (6 q.h.)

Same as TCC 4101 and TCC 4102. *A writing proficiency test is given at the first class meeting.*

TCC 4105 Editing for Science and Technology (3 q.h.)

Covers fundamentals of editing as they apply to scientific, technical, and engineering writing. Examines the role of the editor in business, industry, and the sciences; basic editorial services such as proofreading, copy and content editing, production editing, and project editing; analysis and critique of manuscripts; work with authors; the editor as writer and interviewer; and science interpretation and technical translation. Accelerated work for students already skilled in spelling and grammar. *Prereq. TCC 4101 or instructor's permission.*

TCC 4106 Advanced Editing for Science and Technology (3 q.h.)

Continuation of TCC 4105. *Prereq. TCC 4105.*

TCC 4110 Technical-Promotional Writing (3 q.h.)

Explores structure, style, and graphic presentation of technical-promotional writing in a high-tech environment. Students are trained to combine technical knowledge and writing skills in developing quality technical brochures, articles, product catalogs, demonstration kits, slide presentations, and video scripts. *Prereq. TCC 4101, TCC 4102, or instructor's permission.*

TCC 4301 Computer Software Technical Writing 1 (3 q.h.)

Introduction to the tasks and problems unique to software technical writing. Includes review of fundamental software concepts, the role and importance of software documentation, component parts of software technical manuals and their purposes, tutorial and reference functions of manuals, research tools for manual writing, and the writing process itself. *Prereq. TCC 4101 and MIS 4102 or instructor's permission.*

TCC 4302 Computer Software Technical Writing 2 (3 q.h.)

Continuation of TCC 4301. *Prereq. TCC 4301.*

TCC 4303 Seminar in Software Technical Writing (3 q.h.)

An advanced case-study seminar on contemporary problems in technical writing for the working or prospective writing professional. Emphasizes integrating the viewpoint of the software developer with the task-oriented needs of the end user. Includes system manual design; computer design; modularity; and system evolution. *Prereq. TCC 4302 or instructor's permission.*

TCC 4304 Computer Software Technical Writing (Intensive) (6 q.h.)

Same as TCC 4301 and 4302. *Prereq. TCC 4101 and MIS 4102 or instructor's permission.*

TCC 4311 Instruction Manual Writing 1 (formerly Hardware Technical Manual Writing 1) (3 q.h.)

Introduction to the fundamentals of technical manual writing, including the theory and practice of manual design, organization, and content. Covers copyright law, product liability, graphic design, readability, manual specifications and standards, illustrations, and reproduction techniques. Emphasizes hardware operations manuals. Includes individual and class design and writing projects. *Prereq. TCC 4101 and TCC 4102.*

TCC 4312 Instruction Manual Writing 2 (formerly Hardware Technical Manual Writing 2) (3 q.h.)

Application of skills acquired in TCC 4311 to an entry-level technical manual writing project. Students elect individual or group writing and production projects for high-technology equipment or systems lacking adequate documentation. Includes instruction in writing safe, legible operating instructions and descriptions of installation procedures, principles of operation, and maintenance. Also covers manual changes and updates. *Prereq. TCC 4311 or instructor's permission.*

TCC 4313 Instruction Manual Writing Intensive (6 q.h.)

Same as TCC 4311 and TCC 4312. *Prereq. TCC 4101 and TCC 4102.*

TCC 4320 Proposal Writing (3 q.h.)

Background in the preparation of proposals, including how to analyze a request for proposal or bid set. Introduces the various types of proposals generated by industry and provides an opportunity to prepare a proposal in a simulated situation, through role playing and participation on a proposal preparation team. Includes considerable analysis and writing practice. *Prereq. TCC 4102 or instructor's permission.*

TCC 4330 The Business and Technical Presentation (3 q.h.)

Application of the principles of technical communication to audiovisual presentations. Includes audience analysis, techniques of organization, script preparation, media selection, the design and production of visuals, the influence of physical factors on communication, and the elements of effective delivery. Participants prepare and deliver presentations and receive video playback and peer critiques.

TCC 4335 Introduction to Hypertext Development (3 q.h.)

Designed to give students essential background in developing field of hypertext. Topics include theory and practice, authoring systems, hypermedia topologies and user navigation, hypermedia path mechanisms, and hypertext-based writing tools. *Prereq. TCC 4101 and 4102.*

TCC 4336 Medical Writing (3 q.h.)

Focuses on the scope of medical communications, the role of technology and the medical communicator, patient education, clinical trial reporting, technical/legal issues such as FDA and UL approvals, pharmaceutical writing, and medical editing. *Prereq. TCC 4101 and 4102.*

TCC 4337 Writing for the Biotechnology Industry (3 q.h.)

Examines technical communication in the field of biotechnology, including the areas of health care, agriculture, and industrial "bioprocessing." Explores the role of the biotechnology technical communicator in areas such as marketing and business communication. Covers documentation common in the research, development, and marketing of new products. Provides practice in structuring information into formats such as research articles, development proposals, protocols and instructions, and technical briefings with emphasis on audience analysis as well as content and purpose. Introduces stylistic conventions standard in the life sciences. Integrates documentation planning and project management into the product development cycle.

TCC 4340 Technical Writing Portfolio Development (3 q.h.)

Covers techniques and methods of developing a professional portfolio of published technical writing projects. The organizational and communications skills acquired in lower-level technical writing courses are brought together and applied to "real-world" technical writing problems. *Prereq.* TCC 4302 or instructor's permission.

TCC 4350 Concepts of Modern Technology 1 (3 q.h.)

Surveys applications of physical science to mechanical devices and

introduces the laws of thermodynamics. Considers the influence of material properties on design and manufacturing techniques. *Prereq.* MTH 4006 or equiv.

TCC 4351 Concepts of Modern Technology 2 (3 q.h.)

Surveys applications of physical science to electrical and electronic devices and introduces electronic circuit design. Includes a comparison of various devices used for amplification and control, and a study of the development of the electronic digital computer and the components involved in the manufacture of computers. *Prereq.* TCC 4350.

TCC 4802 Advanced Tutorial 1 (3 q.h.)

Opportunity to take an upper-level course independently. See page 21 for details. *Prereq.* 87 q.h.

TCC 4803 Advanced Tutorial 2 (3 q.h.)

See TCC 4802.

TCC 4805 Field Work in Technical Communications (6 q.h.)

Designed to enhance career development by allowing students to earn credit for the application of their academic backgrounds to practical problems in the work place. See page 21 for details. *Prereq.* completion of 18 q.h. in Technical Communications and Program Director's approval.

TRANSPORTATION

TRN 4301 Elements of Transportation 1 (3 q.h.)

Introduction to regulatory, economic, and management aspects of transportation. Covers concerns of shipping industry, government, and carriers. Includes history of cost, rate-making, operations, entry, mergers, and intercity passenger and cargo carriage. Essential to students in business, law, or government.

TRN 4302 Physical Distribution Management 1 (3 q.h.)

Introduction to the physical distribution management concept. Studies time and place utility of manufactured

products. Includes customer service and profitability requirements: getting merchandise to the customer at the right time, place, and in the right condition. Covers transportation alternatives, inventory control, warehousing, cost control, and location strategy. Contemporary texts and case methods are used.

TRN 4303 Elements of Transportation 2 (3 q.h.)

Continuation of TRN 4301. Examines new thrust of lower costs, including contracting and negotiating for carrier service that has resulted from deregulation. *Prereq.* TRN 4301.

TRN 4304 Physical Distribution Management 2 (3 q.h.)

Continuation of TRN 4303. Analytical skills developed through presentation of problems and cases. *Prereq.* TRN 4302.

TRN 4305 Traffic Management 1: Rates and Tariffs (3 q.h.)

Includes the interpretation and use of tariffs. Examines classifications, rate scales, tariff rules, rate-making procedures, and ICC law and practice. *Prereq.* TRN 4301.

TRN 4306 Traffic Management 2: Selected Topics (3 q.h.)

Further study of traffic management, covering such topics as routing, claims, insurance, consolidation, and packaging. *Prereq.* TRN 4305.

TRN 4316 Carrier Management (3 q.h.)

Explores the transportation system from the carrier viewpoint. Covers managerial response to a heavily regulated and rapidly expanding environment. Includes carrier decision-making involving routes, scheduling, financing, and pricing of services.

TRN 4321 Transportation Negotiations (3 q.h.)

Principle elements of transportation regulation, public policy, and the role of federal and state regulatory agencies are covered. Includes types of commerce, carriers, and services subject to changing regulation, entry and exit requirements, economic and cost considerations, and selective rate and tariff construction rules. Examines industry practices covering performance, requirements, liabilities, and responsibilities of shippers, regulated carriers, and exempt forms of transportation. Discusses rules and procedures established by the ICC and Massachusetts DPU. *Prereq.* TRN 4301.

TRN 4325 Management of Warehouse Operations (3 q.h.)

Management of warehouses is analyzed. Includes site selection, construction, finance, operations, measurement of performance, and warehouse technology.

TRN 4334 Private Trucking (3 q.h.)

The formation of a private trucking operation from a management focus is explored. Includes legal guidelines, purchase versus lease, operations, and performance measurement.

TRN 4340 Air Transportation (3 q.h.)

Topics include economics and regulation of air carriage certified by the Civil Aeronautics Board. Includes entry, operations, pricing, mergers, cost analysis, and financing.

TRN 4341 Commuter Transportation (3 q.h.)

The scope and status of transportation in the metropolitan area is examined. Includes planning and financing urban transportation systems, the role of local, state, and federal government units, and the problems of transit management.

TRN 4342 Transportation Loss, Damage, and Other Claims (3 q.h.)

Covers rules, regulations, and other pertinent elements of transportation claims resulting from the loss or damage of cargo, overcharges and undercharges, and related carrier and shipper activities.

TRN 4350 International Transportation and Distribution Management (3 q.h.)

Examines the safe and efficient overseas transportation of products by air or water. Covers major indirect supporting business and agencies involved in the international movement of people and goods.

TRN 4600 Honors Program 1 (4 q.h.)

Opportunity to undertake an in-depth research study project. See page 21 for details. *Prereq.* 96 q.h., 3.5 q.p.a.

TRN 4601 Honors Program 2 (4 q.h.)

See TRN 4600.

TRN 4602 Honors Program 3 (4 q.h.)

See TRN 4600.

TRN 4701 Independent Study 1 (3 q.h.)

Opportunity to undertake special research. See page 21 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

TRN 4702 Independent Study 2 (3 q.h.)

See TRN 4701.

TRN 4703 Independent Study 3 (3 q.h.)

See TRN 4701.

TRN 4800 Advanced Tutorial 1 (3 q.h.)

Opportunity to take upper-level course independently. See page 21 for details.

Prereq. 87 q.h.

TRN 4801 Advanced Tutorial 2 (3 q.h.)

See TRN 4800.

TRN 4900 Field Work (6 q.h.)

Opportunity to enhance career development by applying academic background to practical problems in the workplace. See page 21 for details.

Prereq. Approval of Program Director.

General Information

Tuition and Fees

Tuition

Tuition for all credit courses is \$116 per quarter hour of credit. Checks and drafts for all charges are to be made to the order of Northeastern University. Charges for registration and tuition for special courses are at the rate specified for each course, with the exception of drama and nontutorial courses. There is no reduction in fees for auditing courses.

Noncredit courses are charged at quarter-hour rates comparable to those of credit courses meeting on an equivalent contact-hour schedule.

Students are not permitted to attend class sessions or take any examination or test until they have paid their tuition fees or have made satisfactory arrangements for payment.

It is the student's responsibility to ensure that all tuition charges and fees

are paid when due. If a bill has not been received prior to the start of classes each quarter, the student should come in person to the Bursar's Office, where a bill will be processed.

Any discrepancies in billing should be immediately brought to the attention of the Bursar's Office. *If there is a billing problem, the undisputed portion of the bill should be paid on time to avoid any additional late fees. Failure to receive a bill through the mail or to pay the undisputed portion of the bill is not justification for late payment of amounts actually owed.*

Students will not be advanced in class standing or permitted to re-enroll in the University nor will degrees be conferred until all financial obligations to the University have been met.

Tuition for Courses in Other Northeastern Departments or Colleges

University College students assigned to courses in other departments or colleges of the University are charged the

tuition fees effective in the departments or colleges in which they are enrolled.

Initial Registration Fee

A nonrefundable \$10 registration fee for first-time University College students is billed with tuition fees.

Tuition Budget Payment Plans

Occasionally situations develop--usually beyond the control of the student--that make it difficult to meet the payments in the manner outlined above. Under such circumstances, the student is advised to contact the Bursar's Office to arrange for deferred payment. The only deferred payment plan offered is as follows and applies only to the amount owed for the current quarter:

| | |
|----------------|--|
| First payment | 1/3 due first week of quarter |
| Second payment | 1/3 due approx. fourth week of quarter |
| Balance | 1/3 due approx. eighth week of quarter |

Such arrangements should be made before the end of the first week of the quarter or within one week of the date of registration if the student enters late. Deferred payment of tuition entails a fee of \$10, which is levied on all accounts not paid by the end of the second week of classes. Failure to take immediate action will result in a late payment fee of \$50.

Tuition Underwritten by Employers

An increasing number of companies are underwriting part or all of the cost of tuition of students in their employ. In cases where payment is to be made directly by the employer to the University, the student should furnish the Bursar's Office with a purchase order covering registration or a statement

from an officer of the company certifying that the company is underwriting the tuition. In cases where students are being reimbursed by their employer, tuition must be paid by the student according to the prescribed regulations to avoid late payment charges.

Veterans' Benefits

Any veteran covered by Public Law 89-358 should report to 126 Hayden

Hall to fill out the proper enrollment forms.

Late Payment Fee

Bills for tuition and fees are payable in accordance with the due date shown. A late payment fee of \$50 is charged for

failure to make payments in accordance with the prescribed regulations.

Refund of Tuition

The general policy in all schools and colleges of the University with respect to refunds of tuition is as follows: the University provides all instruction on an academic-quarter basis, for which students pay at the beginning of each quarter. Tuition refunds are granted through the first four weeks of a quarter only when specific conditions are met and are granted only on the basis of the date appearing on the official withdrawal application when filed with the Registrar in 120 Hayden

Hall. Nonattendance does not constitute official withdrawal. Questions regarding refunds should be discussed with the Bursar.

Refunds are granted in accordance with the following schedule:

| Official withdrawal filed within | % of tuition credited |
|---|------------------------------|
| First week of quarter | 100% |
| Second week of quarter | 75% |
| Third week of quarter | 50% |
| Fourth week of quarter | 25% |

New Low Rate for Friday and Saturday Intensives

University College offers a selection of six-quarter-hour courses at the Boston and Burlington campuses on Friday evenings and Saturdays at a special

reduced tuition rate of \$596 (\$100 less than the normal tuition). Check the current *Schedule Guide* for a list of these courses.

Fees

Student Center Fee

All students in University College on the Huntington Avenue campus are charged \$.75 each quarter for the

services available in the Student Center.

Laboratory Fees

Students enrolled in courses that carry a laboratory fee must purchase a Laboratory Fee and Deposit Card from the Cashier's Office (\$15 for extra cards).

A fee of \$45 is charged for biology courses and for those health professions courses that include a laboratory. For chemistry courses, cards cost \$60 per quarter with the possibility of a \$5 refund at the end of the quarter, depending on breakage. Upon completion of

the course or withdrawal during the quarter, the student must check his or her status with the laboratory attendant. The Cashier's Office will then refund any unused balance shown on the card.

Music students enrolled in music instruction pay a special rate. For details contact Jeanne Segal, University College Music Coordinator, 351 Ryder Hall, telephone 617-437-2440 or 617-437-2442.

**Mandatory
Medical
Insurance
Fee**

All Northeastern University students who are either classified as full-time or who are in a degree program carrying a courseload of 9 credits or more are required by law to be covered by medical insurance. You will be enrolled automatically in the University's plan at a \$400.00 charge to your Northeastern

account. Or, if you are covered by comparable medical insurance, you may waive the university's plan. Northeastern University medical insurance waiver forms are available at the Bursar's Office, room 245 Richards Hall. 617-437-2250.

**Missed Final
Examination
Fee**

Students absent from the regularly scheduled final examination at the end of a course may petition for a missed final examination. The fee for each

examination requested by the student is \$50. The fee must be paid when the petition is filed in the Office of Academic and Student Affairs.

Transcripts

Students may request official transcripts of their grades at the Registrar's Office. There is a charge of

\$2 per copy, payable in advance. Unofficial transcripts are issued free of charge.

Financial Aid

The Office of Financial Aid, located on the 3rd floor of Richards Hall, offers several types of assistance to part-time and full-time University College students. All awards are based on financial need. Aid granted from programs sponsored by the federal or

state government is dependent upon the amount of funding allocated to Northeastern University. Federal regulations require that students who receive financial aid funds be United States citizens or permanent residents.

**Application
Procedure**

All students applying for financial aid must submit a Financial Aid Form (FAF) to the College Scholarship Service. The College Scholarship Service is an agency which collects financial data from students and distributes that data to schools, state agencies, and the Pell Grant program.

Federal regulations require that students submit a Financial Aid Transcript (FAT) from each school they have previously attended to the Office of Financial Aid at Northeastern University before they can receive financial aid at Northeastern. This is required even if you did not receive aid at the other institution(s).

Northeastern University also requires its students to complete an Institutional Application. This form gathers information that assists the

office in determining a student's eligibility for aid.

All application materials are available at the Office of Financial Aid. Students should begin the application procedure at least eight weeks before the start of the quarter in which they plan to enroll. Students must apply for financial aid each academic year.

In order to be eligible for financial aid (with the exception of the Massachusetts Part-time Grant for up to 15 quarter hours of aid) students must be enrolled in a degree granting program prior to the start of the academic quarter. Students not yet enrolled in a program should contact the University College Office of Academic and Student Affairs, 180 Ryder Hall.

Satisfactory Academic Progress

For all students who are receiving financial aid for the first time on or after July 1, 1987, satisfactory academic progress will be determined based on having achieved a 2.0 QPA after the completion of the second

grade level and maintaining that minimum until completion of the degree. Students not achieving a 2.0 QPA or dropping below that minimum after their second grade level will not, by Federal law, be eligible for financial aid.

Financial Aid Programs

Aid programs available vary depending on the number of quarter hours a student plans to attend each quarter. Financial aid to students is offered in the form of loans and grants. The Pell

Grant, Massachusetts State Scholarship, Massachusetts Part-Time Grant Program, Massachusetts Adult Learners Grant, and the Stafford Student Loan Program are available.

Pell Grant

Based on a student's financial information, a student may be eligible for a Pell Grant. The Pell Grant Program is a federal aid program designed to provide financial assistance to undergraduate degree candidates. Approximately six weeks after a student has filed the FAF, the Pell Grant Processor will send the student a Student Aid Report (SAR). If a student is eligible for a Pell grant, the SAR must be submitted to the Office of Financial Aid. The amount of Pell that is

awarded will be based on the number of quarter hours a student enrolls in each quarter. This program requires that a student:

- be enrolled in a degree program and take at least 6 quarter hours per quarter;
- be a U.S. citizen or permanent resident;
- be achieving satisfactory academic progress; and
- not already have a bachelor's degree.

Massachusetts State Scholarship

Massachusetts residents enrolled as full-time students (i.e. taking at least 12 quarter hours per quarter) may be eligible for a Massachusetts State Scholarship. To apply, students must

submit the Massachusetts version of the FAF by the published deadline. State Scholarships are awarded by the Massachusetts State Scholarship Office and are based on need.

Massachusetts Part-Time Grant Program

The Massachusetts State Legislature has established a grant program for part-time students. To be eligible for the grant, students must be permanent legal residents of Massachusetts for at least one year prior to the beginning of the academic year, a U.S. citizen or permanent resident, and be taking at least 3 quarter hours and not more than 11 quarter hours per quarter.

Students who are not enrolled in a degree program or who already have a bachelor's degree may receive up to 15 quarter hours of aid. Those students

who are not enrolled in a degree program and do not have a prior degree and wish to be considered for the grant beyond 15 quarter hours must enroll in a degree program.

Eligibility for the Part-time Grant is based on financial need. The maximum amount of grant per academic year is \$1,000. The amount of the award cannot exceed the cost of tuition, books and fees.

Students who receive 100% tuition reimbursement from their employers are not eligible for the grant.

Massachusetts Adult Learners Grant

The Massachusetts Board of Regents of Higher Education has established the Adult Learners Program as a need-based, state-funded, financial aid program designed to assist current Aid for Dependent Children (AFDC) recipients in obtaining a college education. The amount of each award varies depending on the applicant's demonstrated

need. In addition to being a current AFDC recipient, a student must be a permanent legal resident of Massachusetts for at least one year prior to the beginning of the academic year to be eligible. Students may be enrolled on a full-time or part-time basis (minimum enrollment requirement of 3 quarter hours per quarter).

Stafford Student Loan Program

The Stafford Student Loan Program (formerly the Guaranteed Student Loan Program) enables a student to borrow a maximum of \$2,625 per academic year during the freshman and sophomore years (first and second grade levels) and up to \$4,000 per academic year for subsequent grade levels from a participating bank or other financial institution. The federal government pays the interest while the student is in school. This loan must be repaid.

Students may be eligible for a loan if they are enrolled in or have been accepted for enrollment on at least a half-time basis in a degree granting program, are citizens or permanent residents of the United States, and show financial need in accordance with the federal guidelines.

The legal maximum loan that can be borrowed through the Stafford Student Loan Program for an entire undergraduate program is \$17,250.

In order to have a loan application processed by the Financial Aid Office, a student must have a complete financial aid application on file, have received a letter of eligibility from our office and have submitted a Stafford Student Loan Application. Applications for the loan are available from local lending

institutions and the Office of Financial Aid.

Repayment of the loan usually begins six months after a student withdraws, graduates from an educational institution or ceases to carry at least a half-time course load. The repayment period may be as long as ten years. The amount of the payments depends upon the size of the debt, but must be at least \$50 per month.

Repayment on loans may be deferred under certain circumstances. For details, contact your lender.

Students who borrow funds through this program must report any of the following changes to their lenders:

- withdrawal from school;
- transfer to another school;
- reduction of course load to less than half time;
- change of address or parents' address; and
- change of name.

Additional information about financial aid is available from the Office of Financial Aid, 3rd Floor, Richards Hall, 617-437-3190.

All federal financial aid programs are subject to change depending on adequate and continuing federal support.

Scholarships

The following University College and School of Engineering Technology scholarships and awards are available to students who have been accepted as degree candidates and are in good academic standing.

Scholarships are awarded once a year by the Scholarship Committee. Final

selection of scholarship recipients is usually made in late May, followed by the awarding of the scholarships in late June or early July. Funds are usually applied to tuition expenses for the following academic year. Awards range in amount from \$300 to \$1,000.

Application Procedure

In January, a mailing list of students who have requested applications is prepared and applications are mailed out with the stipulation that they be completed and returned to the Office

of the Dean by March 31. A student can be placed on the January mailing list by calling 617-437-2400 and leaving his or her name, address, and student ID number with the receptionist.

Dean Kenneth W. Ballou Family Scholarship Fund

The Dean Kenneth W. Ballou Family Scholarship Fund was established in 1986 by the generosity of the Kenneth W. Ballou family. Dean Ballou served Northeastern University in various capacities from 1957 to 1978, including as Director of Undergraduate Admissions, Dean of University Relations,

Assistant to the President, Dean of Adult Education Programs, and Dean of University College. This scholarship is awarded annually to a University College student(s) who demonstrates financial need, academic promise, and leadership potential.

James A. Buczel Memorial Scholarship University College

This scholarship was established in 1988 in memory of James A. Buczel, who received his Associate in Science degree in 1978. The endowment funds were provided by the family, friends, and associates of Mr. Buczel who was a member of the U.S. Customs Service of the Department of the Treasury. He lost his life in the line of duty while

inspecting cargoes on Sunday, October 9, 1988 in New Haven, Connecticut. The income from this memorial scholarship fund is to be awarded to undergraduate students in University College who are majoring in Law Enforcement and demonstrate financial need, academic promise, and soundness of character.

Dorothy G. Cooley Scholarship

This scholarship was established in 1988 by Dorothy G. Cooley, a 1960 graduate of the evening division of The School of Business, now University College. The income from this fund is to be awarded to responsible women

students who are candidates for a bachelor's degree and who have demonstrated soundness of character and who have above average scholastic ability.

Henry J. Doherty Memorial Scholarship

The Henry J. Doherty Memorial Scholarship Fund was established in 1987 through the generosity of Doris R. Doherty, as a tribute to her late husband, a 1953 graduate of the Evening School of Business and a successful business leader in the field of legal

publishing. The income from the scholarship is awarded annually to deserving students with demonstrated financial need who are pursuing part-time evening study and have been accepted as degree candidates.

Electronics Industries Personnel Association Scholarship

This scholarship was established in 1980 through the generosity of the Electronics Industries Personnel Association. The income is awarded annually to one or more students whose studies, to a significant extent,

are in the field of human resources management at University College. Recipients shall demonstrate financial need, soundness of character, and academic stability.

Vincent A. Forte Memorial Scholarship

This scholarship was established in 1985 in memory of Vincent A. Forte, a graduate of Northeastern University. The endowment funds were provided through the generosity of his family, friends, and associates. Forte was an ambitious student pursuing a full-time business career while attending school part-time. He received an associate's degree from Lincoln Institute in 1957, a Bachelor of Business Administration

degree in 1958, and a Master of Business Administration degree in 1967. The income from this fund is awarded to undergraduate students in University College who are pursuing a bachelor's degree in business, who demonstrate financial need, and who are maintaining a cumulative quality-point average of 3.0 or better after completing at least 44 quarter hours of credit.

Kappa Tau Phi Scholarships

The Kappa Tau Phi Sorority Scholarship Fund annually makes scholarship awards available to women students in the science, business, engineering, and liberal arts programs who rank highest at the end of the upper-middle year. In the event that the chosen student is eligible for an award of greater monetary value, the award is made to

the next highest-ranking woman student. To be eligible for this scholarship, the student must be enrolled in a course meeting at least two evenings per week and must be a candidate for a bachelor's degree. In determining the recipient, grades of all courses completed in prior years are considered.

Martin Luther King, Jr. Scholarships

This scholarship fund was established in 1969 in memory of the late Reverend Martin Luther King, Jr. Awards are made, as openings occur, to a limited number of adults from minority groups who would otherwise be unable to continue their education.

Stipends can cover tuition expenses not to exceed six quarter hours in any academic quarter (excluding summer quarter). Northeastern University's Office of Financial Aid, located in Richards Hall, administers these scholarships.

Alan A. and Shirley A. Mackey Scholarship Fund

The Alan A. and Shirley A. Mackey Scholarship Fund was established in 1987 upon the retirement of Alan A. Mackey from Northeastern University. Dean Mackey served Northeastern University in many capacities: as Dean of Administration, University

Registrar, Dean of Continuing Education, and as a member of the mathematics faculty of University College. The scholarship fund provides annual scholarship awards to deserving University College students.

Timothy F. Moran Scholarship Fund

This scholarship fund was established upon the retirement of Dean Timothy F. Moran, Associate Dean at University College and Director of the Law Enforcement programs. During his second career as an educator, Dean Moran, a retired state police officer, was an innovator and leader in the education of law enforcement officers both in

New England and throughout the world. His former students, colleagues, and friends made substantial contributions to establish this fund in his honor. This scholarship is awarded annually to students majoring in policing, security or corrections who demonstrate academic excellence and financial need.

William J. McGovern Memorial Scholarship

The William J. McGovern Memorial Scholarship was established in 1978 by an anonymous donor to honor the memory of William J. McGovern. The donor wishes to assist others in realizing their potential through higher education. The income from this scholarship benefits worthy under-

graduate students actively pursuing studies in University College or the School of Engineering Technology. Recipients must have declared a major, demonstrated financial need and academic achievement, and exhibited a high level of professional promise.

Professor Joseph A. Mullen Scholarship

The Massachusetts Chapter of the American Society for Training and Development has established a fund to provide annual scholarship awards to

deserving part-time students upon the recommendation of the Dean of University College.

Eva Needle Memorial Scholarship

The Eva Needle Memorial Scholarship Fund was established in 1965 with the aid of the Norman Knight Charitable Foundation and is maintained through the generosity of the friends of Bob and Ted Needle in memory of their mother. The income from the fund is awarded

annually to a deserving student in the accounting program who demonstrates superior academic achievement. The recipient is selected jointly by Ted Needle, a long-standing member of University College's accounting faculty, and the Scholarship Committee.

Harry Olins Memorial Scholarship

The Harry Olins Memorial Scholarship Fund was established as an expression of a belief in University College students and "what they stand for." The fund, presented by Mrs. Olins in recognition of her husband's long service on the business faculty, makes available an annual tuition award to

students who, in terms of scholastic achievement, character, and personal need, best typify the spirit of Northeastern University. To be eligible for this award, the student must be a business administration degree candidate and carry a full academic load during the school year.

Nancy Lee Patterson Memorial Scholarship

This fund was established in 1988 by the family and friends of Mrs. Nancy Lee Patterson at the time of her death. Income from the fund is awarded annually to female students, age 35 or

over, attending University College, who demonstrate financial need, soundness of character, and academic stability.

Sigma Epsilon Rho Honor Society Scholarship Award

The Sigma Epsilon Rho Honor Society Scholarship Award, established in 1974 by the membership of the Society, is awarded annually to undergraduate students of University College or the

School of Engineering Technology. Eligible students must have a cumulative quality-point average of 3.0 or better after completing 75 percent or more of their required studies.

H. Patricia Taylor Scholarship Fund

The H. Patricia Taylor Scholarship Fund was established in 1974 by H. Patricia Taylor, a graduate of University College, and her husband, Harry C. Taylor, a graduate of the School of Business. The scholarship expresses their appreciation for financial assistance made available to Mrs. Taylor when she was obtaining her degree and is an attempt to provide

similar funds to assist others in realizing their potential through higher education. The income from the fund is awarded annually to a student enrolled in University College or the School of Engineering Technology who demonstrates financial need and academic stability and who meets certain other conditions of eligibility.

**Transportation
Club of New
England
Scholarship**

The Transportation Club of New England provides approximately eight scholarships annually for persons employed in transportation and industry traffic departments. Scholarships are applicable toward tuition, books, and incidental expenses involved in transportation management courses. The Club's purpose is to afford a limited number of people an opportunity to expand and improve their education by systematic study of

transportation and distribution management. Scholarships are administered cooperatively with the Scholarship Committee of the Transportation Club of New England. Applications may be secured from and filed with Frank Smith, Secretary, Transportation Club of New England, P.O. Box 121, Reading, MA 01867. Each applicant must be sponsored by a member of the Transportation Club.

**U.S. Navy
Field Training
Supervisors
Association
Memorial
Scholarship**

A scholarship fund has been established through the generosity of the U.S. Navy Field Training Supervisors Association in commemoration of the Association's deceased members. The scholarship is awarded annually to a

deserving student, selected by the Scholarship Committee, who is a management major working toward a bachelor's degree in the evening program at University College.

**University
College and
the School of
Engineering
Technology
Faculty
Society
Memorial
Scholarship
Awards**

The Faculty Society of University College and the School of Engineering Technology offer two awards annually, primarily for excellence in studies, to bachelor's degree candidates in University College and the School of Engineering Technology who have carried and are currently carrying a

minimum of twenty-four quarter hours annually. Applications, available during the winter quarter, must be returned before the spring quarter. These awards are given in commemoration of the Faculty Society's deceased members.

**Roberta
Macycove
Wasserman
Memorial
Scholarship**

This scholarship was established in 1976 through the generosity of family members and friends of Roberta Macycove Wasserman, who, at the time of her death in 1975, was pursuing liberal arts studies within University College. The income from the fund is

awarded annually to a deserving female student who is a homemaker with family responsibilities and who is pursuing part-time studies within University College. The recipient shall demonstrate financial need, soundness of character, and academic stability.

Awards

**John W.
Robbins
Prize**

The John W. Robbins Prize was established in 1984 under the terms of the will of the late Lena C. Robbins, in memory of her husband, John W. Robbins, an alumnus of Northeastern

University. The income from this memorial gift is awarded annually to the outstanding student (Class Marshal) of the graduating class of University College.

Facilities and Resources

Sport, Dance, and Exercise Facilities

Northeastern is concerned with providing for the health and fitness of our students, and we continually expand the sports, exercise, and recreational options available to you. All part-time students have access to our extensive gymnasium facilities. The University offers you a variety of specialized facilities, including basketball courts, dance studio, an indoor athletic field and a running track, a gymnastics room, a combatives room, weight-training rooms, a swimming pool, a crew practice tank, racquetball courts, and motor performance and exercise physiology laboratories. The Matthews Arena, with seating for more than 5,000 fans, is home to the University's varsity and subvarsity hockey and basketball teams.

For organized athletics requiring facilities not available on the main campus, Northeastern maintains the

Northeastern Boat House, which is located on Memorial Drive in Cambridge and is home to the University's crew teams. The Edward S. Parsons Field, on Kent Street in Brookline, is the playing ground for the football, baseball, women's lacrosse and women's field hockey teams, and some intramurals. The Bernard M. and Jolane Solomon Track, a recently completed outdoor track and field facility in Dedham, has an eight-lane, Action Trak 200 running surface and an expansive area for concurrent jumping and field events. This new facility is ready to host dual and championship meet competitions and is a permanent site for Northeastern University track athletes.

You must present a valid Northeastern student identification card and a photo identification card for access to the facilities.

Social and Professional Clubs

We welcome and encourage part-time students in University College and the School of Engineering Technology to join in the social and professional activities that are organized and run by the student body, with the assistance of the Office of Academic and Student Affairs. If you and your peers are

interested in starting new professional clubs, the office will help to plan and organize locally and nationally. Call 617-437-2400 for more information.

All programs are designed to keep pace with changing student needs and interests and to provide maximum opportunity for your participation.

Sigma Epsilon Rho Honor Society

Sigma Epsilon Rho is the University College honor society. It aims to promote fellowship among those students who have attained highest scholastic standing in the College; to stimulate the student body to higher scholastic accomplishment through the bearing, influence, and work of these selected men and women; to develop methods of

mutual improvement and advancement among members; and to support high moral, professional, and scholastic ideals.

Only honor graduates or seniors with honor standing at the end of their junior year are eligible for admission to the Society. Admission is by invitation after nomination by the Society.

Ell Student Center

Student recreation and extracurricular activities of all kinds are held at the Carl S. Ell Student Center. The center houses the Blackman Auditorium, which seats 1,300; special drama

facilities; a ballroom; a main lounge; fine arts exhibition space; student offices; conference rooms; a cafeteria with seating for more than 1,000; and a bookstore.

**Lane Health
Center**

The well-being of all Northeastern students is a crucial concern for the University. The health services clinic of the Lane Health Center, located on

the Boston campus, is equipped to deal promptly with medical emergencies at all times.

**Alumni
Association**

Upon graduation, you will join the more than 93,000 alumni united within the Alumni Association, which was established to promote a mutually rewarding relationship between Northeastern and its graduates. Association

activities include the Homecoming celebration, presentation of the Outstanding Alumni Awards, and the annual presentation of Professional Promise Awards to outstanding seniors in each of the colleges.

Northeastern University

Profile of the University

At Northeastern University, we value part-time day and evening students as highly as we do our full-time students. You are important members of the academic community and reflect the changing profile of today's college student, which encompasses new concerns for lifespan learning and professional retraining. Northeastern supports your pursuit of personal and professional goals and wants to contribute to your success. You may join all of our students in taking full advantage of the academic resources and facilities we offer. In return, you contribute to the intellectual and cultural diversity upon which this urban institution thrives.

Founded in 1898, Northeastern University is incorporated as a privately endowed, nonsectarian institution. From its beginning, the University's mission has been to identify and address the educational needs of a diverse community and student body in distinctive and useful ways. Northeastern did not duplicate the programs of other institutions, but instead became a world leader in new areas of educational service. In particular, the University is known for its Cooperative Plan of Education, under which students alternate periods of work and study. All of Northeastern's undergraduate day colleges operate on the Cooperative Plan, and several of the University's graduate schools have structured their programs to include features of cooperative education. Today, the University is comprised of nine undergraduate colleges and ten graduate schools.

Our undergraduate colleges are:

- Boston-Bouvé College of Human Development Professions
- College of Arts and Sciences, including the School of Journalism
- College of Business Administration
- College of Computer Science
- College of Criminal Justice

- College of Engineering, including the School of Engineering Technology
- College of Nursing
- College of Pharmacy and Allied Health Professions
- University College

Our graduate schools are:

- Graduate School of Arts and Sciences
- Graduate School of Boston-Bouvé College of Human Development Professions
- Graduate School of Business Administration
- Graduate School of Computer Science
- Graduate School of Criminal Justice
- Graduate School of Engineering
- Graduate School of Nursing
- Graduate School of Pharmacy and Allied Health Professions
- Graduate School of Professional Accounting
- School of Law

At Northeastern University, we respond to the needs of people who already hold jobs or are launched in careers, but who wish to advance or change their professional lives as well as pursue personal interests. The University offers a variety of educational options—both credit and noncredit—to suit your particular objectives. University College offers part-time courses leading to certificates and to associate's and bachelor's degrees. The School of Engineering Technology offers part-time evening and weekend associate's and bachelor's degree programs in technological areas, in addition to daytime undergraduate programs.

All formal courses of study leading to degrees through part-time programs are approved by the full-time day faculty of the Northeastern Basic Colleges concerned and are governed by the same qualitative and quantitative standards.

Where You'll Find Northeastern

The main campus of Northeastern University is a vibrant and progressive urban community. To all Northeastern students, the physical setting of the Boston campus extends opportunities to participate in the dynamic, exciting environment that we share with city residents. Built around a quadrangle, the campus is divided by Huntington Avenue, a major artery. It is located in the midst of such cultural landmarks as Symphony Hall, the Museum of Fine Arts, the Isabella Stewart Gardner Museum, Horticultural Hall, and the Boston Public Library. You can walk to Fenway Park, Copley Place, the Back Bay shopping district, and a number of internationally renowned hospitals. In 1910, the University began construction on the first piece of land acquired at its present site; it now covers more than fifty-five acres.

To reach increasing numbers of students and to make participation in our programs as convenient as possible for you, Northeastern University has established suburban campuses and branch locations, as well as several off-campus athletic facilities. The campuses and branch locations house administrative and classroom facilities for Northeastern's graduate, part-time day and evening, and continuing education programs. The University also maintains many affiliations to ensure access to facilities and specialized equipment available at other institutions and organizations.

One of Northeastern's most recent acquisitions is the twenty-acre Dedham campus, just north of Route 128. This facility houses the Center for Continuing Education and provides space for the College of Business

Administration's High Technology MBA and Executive MBA programs and the Center for Management Development's Management Workshops.

Near the junction of Routes 128 and 3 in Burlington is the Suburban Campus of Northeastern University. Part-time undergraduate courses in a variety of subject areas and part-time graduate courses in engineering and business administration are offered here. The Burlington campus also offers special programs for part-time, evening, and noncredit continuing education courses.

Located near the Burlington campus, the Botanical Research Station in Woburn contains a small arboretum and a spacious greenhouse for propagation and research.

Situated on fifty acres in Ashland, the Warren Center provides a practical laboratory for outdoor education and conservation, and camping administration, programming, and counseling. In the summer, the center becomes an attractive campsite for various community and University groups and is available for conferences and workshops.

Twenty miles northeast of Boston, the Marine Science and Maritime Studies Center is located in Nahant, on Massachusetts Bay. It serves as a site for national, international, and University research.

Henderson House, Northeastern University's conference center, is located twelve miles from Boston in suburban Weston. This facility hosts a variety of activities, including residential seminars, workshops, short courses, and weekend meetings.

setting or through individual study and enrichment.

All part-time students have full access to all units of the University Libraries located on the Boston, Burlington, and Dedham campuses and at the Marine Science Center in Nahant.

During the summer of 1990, a centralized library for the Boston campus, merging several smaller units, opened

University Libraries

Together, the collections, services, staff, and facilities of the Northeastern University Libraries provide access to information and an understanding of the organization of the literature and other information resources of the academic disciplines. The library is integral to the academic and research processes, whether these occur in a formal classroom, seminar, or laboratory

for service. It is the largest academic library building in Boston. A five-level structure with 2,700 seats and shelving for more than 1.25 million volumes, it triples previous library capacities for both seating and on-site collection accessibility. The facility houses the latest in online, telecommunication, and media technologies that are associated with information resources, including computer-assisted instruction and microcomputer, language, and music-listening laboratories.

The total holdings of the University Libraries include more than 600,000 volumes, 1,400,000 microforms, current subscriptions to over 6,400 serials and newspapers, 250,000 government documents, and 15,000 audio and video and computer software titles.

Library staff are available in all service areas to assist students. Librarians provide instruction to groups and to individuals on the bibliographic research process and on strategies for locating and using library resources. Each term, a series

of tutorials is offered giving students further opportunities to meet with a librarian to discuss particular or specialized research needs.

Northeastern University is a member of the Boston Library Consortium, a cooperative arrangement among the following academic and research institutions: Boston College, Boston Public Library, Boston University, Brandeis University, Massachusetts Institute of Technology, the State Library of Massachusetts, Tufts University, the University of Massachusetts (Amherst, Boston, and Worcester campuses), and Wellesley College. The University's membership in the Boston Library Consortium generally allows for on-site use by, but does not grant borrowing privileges to, students at Northeastern. Some of the consortium libraries and many of the other libraries in the Boston area require that a visiting student present a special pass or letter of introduction. A Northeastern reference librarian can advise about such student visitor policies.

Academic Computer Services

Northeastern's Academic Computer Services supports the learning activities of student at all levels, as well as the teaching and research undertaken by faculty, research personnel, and graduate students. The programming assistance offered at the Boston, Burlington, and Dedham campuses promotes effective use of all academic computer systems. At these three campuses, 270 assorted personal computers are linked in local-area networks. Via a wide-area network, students and faculty have time-sharing access to five large computers through video and hard-copy terminals arrang-

ed in clusters at the three campuses. This network connects a Digital Equipment Corporation VAX 8650 system plus an additional VAX 11/785 and a Data General MV/8000. A variety of graphics and output devices are available.

Electronic spreadsheet and word-processing packages are available to you, in addition to many software libraries for numerical, statistical, and financial applications. The primary languages supported by Academic Computer Services are FORTRAN, COBOL, BASIC, Pascal, and Assembler.

Research

Research, whether performed in the laboratory, library, or field, is vital to maintain the University's thriving academic atmosphere. Through research, faculty members and students stay abreast of the most recent developments in their particular fields. Every department of every college at Northeastern carries out some

basic or applied research projects.

At Northeastern University, research and scholarship are taken very seriously and are actively encouraged. Each year faculty members receive funding for an ever-increasing number of research projects, for which sponsorship comes from a variety of sources. Federal agencies, private industry and

foundations, and the university itself, all contribute to Northeastern's growing research base.

Although much of this research is carried out by faculty members, their graduate students, and post-doctoral research associates, ample opportunities exist for undergraduate students. Research participation can take place as part of regular academic programs, as specially designed independent studies, or through cooperative work assignments. Research activities are encouraged and are limited only by the student's own motivation and curiosity.

Northeastern University's faculty has numerous distinguished scholars, many of whom have received

prestigious awards, including Sloan Scholarships, Guggenheim Fellowships, and National Institute of Health Research Awards. Faculty members lecture worldwide and publish extensively; through these efforts the faculty enhance their teaching and help to ensure an exemplary university education.

In addition, many faculty serve as U.S. government consultants and participate on a variety of national and international committees. But because Northeastern considers education its primary mission, students will always find an enthusiastic and accessible faculty to answer questions, solve problems, and stimulate inquiring minds.

Programs at Northeastern

Undergraduate Colleges

Boston-Bouvé College of Human Development Professions

Offers programs leading to the Bachelor of Science in Education in early childhood education, elementary education, human services, physical education, athletic training, cardiovascular health and exercise, and

school and community health education; the Bachelor of Science in Recreation and Leisure Studies; and the Bachelor of Science in Physical Therapy. For more information, call 617-437-2200.

College of Arts and Sciences

Offers programs in the visual and performing arts, humanities, social sciences, and mathematics/sciences leading to the Bachelor of Arts and Bachelor of Science degrees. Programs

are normally four years in length on a full-time plan or five years in length on the cooperative plan. For more information, call 617-437-3980.

College of Business Administration

Offers a five-year, cooperative education program leading to the Bachelor of Science in Business Administration. Students complete a concentration in accounting, human resources management, marketing, finance and insurance, management, international

business administration, entrepreneurship and small business management, management information systems or logistics and transportation. For more information, call 617-437-3270.

College of Computer Science

Offers a five-year and a four-year cooperative education program leading to the Bachelor of Arts in Computer Science, and the Bachelor of Science in

Computer Science, with emphasis tracks in data-base management, programming languages, and systems. For more information, call 617-437-2462.

College of Criminal Justice

Offers a five-year, cooperative education program leading to the Bachelor

of Science degree. For more information, call 617-437-3327.

College of Engineering

Offers four- and five-year cooperative education programs in chemical, civil, electrical (including a power systems option and a computer engineering option), industrial, and mechanical engineering leading to the Bachelor of Science with specification according to the department. A more general program leading to the Bachelor of Science without specification is also offered. For highly qualified students, the electrical and computer engineering, mechanical engineering, and in-

dustrial engineering and information systems departments offer five-year programs leading to the bachelor's and the master's degrees; students generally carry five courses per quarter and forego one cooperative work quarter to complete the program. The College also offers a six-year, part-time evening program leading to the Bachelor of Science degree in civil, electrical, or mechanical engineering. For more information, call 617-437-2154.

College of Nursing

Offers five-year, cooperative education program leading to the Bachelor of Science in Nursing. The College also offers an R.N. to B.S.N. option to registered nurses who wish to pursue a baccalaureate degree in nursing. The R.N. to B.S.N. option is offered for full-time students by the College of

Nursing and for students desiring part-time evening study in collaboration with Northeastern University's part-time unit University College. The program is accredited by the National League for Nursing. For more information call 617-437-3610.

College of Pharmacy and Allied Health Professions

Offers five-year, cooperative education programs leading to the Bachelor of Science in Pharmacy, Respiratory Therapy, and Toxicology, and to the Bachelor of Science with a major in medical laboratory science and health record administration. A non-cooperative four-year baccalaureate program is offered in Dental Hygiene. Associate's degree programs are offered in medical laboratory science and dental hygiene. The College also offers

post-baccalaureate certificate programs for physicians' assistants (the PA option is a 2-year full or part-time program with the option of an MHP), health record administrators, respiratory therapists, perfusion technologists, and medical laboratory scientists (concentrations in blood banking, clinical chemistry, hematology, and microbiology). For more information, call 617-437-3320.

School of Engineering Technology

The School of Engineering Technology, a division of the College of Engineering, offers programs leading to the Associate in Engineering, Associate in Science, and Bachelor of Engineering Technology degrees. A full-time, five-year cooperative education plan is offered, at the baccalaureate level, in electrical and mechanical engineering technology and computer technology. In addition to the majors mentioned for full-time study, part-time evening and weekend programs are available at the associate and baccalaureate levels in

telecommunications, energy systems, architectural, environmental, manufacturing, structural, and surveying and highway engineering technology. A baccalaureate degree program in aerospace maintenance engineering technology is available for transfer students, both full- and part-time. Many of the technology courses are televised via Network Northeastern to satellite campuses and company sites. For more information, call 617-437-2500.

Graduate Schools

Boston-Bouvé College of Human Development Professions

Offers full- and part-time programs leading to the Master of Science degree with specializations in counseling psychology; exercise sciences; human resource counseling; physical education; recreation, sport, and fitness management; rehabilitation administration; rehabilitation counseling; speech-language pathology and audiology.

The Master of Education degree may be earned with a specialization in counseling, consulting teacher of reading, curriculum and instruction, educational research, human development, or special education. The Doctor of Education degree may be earned in counseling, psychology, or rehabilitation administration. For more information, call 617-437-2708.

College of Arts and Sciences

Offers programs leading to the Master of Arts degree in economics, English, history, journalism, political science, psychology, sociology, social anthropology, and writing. The Master of Science degree is available in biology; chemistry; economic policy and planning; law, policy, and society; mathematics; and physics. The Master of Technical and Professional Writing, the Master of Science in Health Science, the Master of Journalism in News Media Management, and the Master of Public Administration

degrees are also offered. In addition, there are programs leading to the Certificate of Advanced Graduate Study in advanced literary study and to the Doctor of Philosophy degree in biology; chemistry; economics; law, policy, and society; mathematics; physics; psychology; and sociology. There are also certificate programs in economics of the workforce and development planning and in technical writing. Most programs may be completed through either full- or part-time study. For more information, call 617-437-3982.

College of Business Administration

The Graduate School of Business Administration offers five programs leading to the Master of Business Administration (MBA) degree. Options include a Cooperative Education MBA program, a Full-time MBA program, and a Part-time MBA program. An Executive MBA program tailored to the needs of experienced managers and a High-Technology MBA program designed for professionals in the high technology community are also offered on a part-time basis. Additionally, a nondegree program leading to the Certificate of Advanced Study is available. For more information, call 617-437-2714.

The Graduate School of Professional Accounting offers a unique fifteen month comprehensive master's degree

program specifically designed for the liberal arts and sciences graduate. The program features a three-month paid internship with a major CPA firm and achieves virtually 100% placement for its students upon graduation. For more information, call 617-437-3244.

The Center for Management Development offers a variety of nondegree programs and graduate-level workshops, including the Management Development Program, the Management Workshop, and the Management Workshop-High Tech. The Center also offers custom corporate in-house management education programs. For more information, call 617-437-3272.

College of Computer Science

Offers full- and part-time programs leading to the Master of Science in Computer Science with concentrations in artificial intelligence, communications and networks, data-bases, systems software, and theory. The Doctor of Philosophy program includes

theory, artificial intelligence, database management, operating systems, programming languages, computers, and computer architecture and hardware. For more information, call 617-437-3539.

College of Criminal Justice

Offers both full- and part-time programs leading to the Master of Science in Criminal Justice. Criminal Justice students may concentrate in administration and planning,

criminology and research, security, or develop their own multidisciplinary concentration under the supervision of a faculty advisor. For more information, call 617-437-3327.

College of Engineering

Offers programs leading to the Master of Science with specialization in chemical, civil, industrial, and mechanical engineering; electrical and computer engineering; and computer systems engineering. A five-year program leading to both a Bachelor and a Master of Science degree is offered in electrical, industrial, and mechanical engineering. Professional Engineer's degrees are offered in electrical,

industrial, and mechanical engineering. The doctor of philosophy degree is offered in chemical, civil, electrical, mechanical and industrial engineering and information systems. A doctor of engineering is offered in chemical engineering. Women in Engineering and Women in Information Systems programs are also available. For more information, call 617-437-2711.

College of Nursing

Offers full and part-time Master of Science in Nursing program. The master of science degree may be earned with a specialization in Community Health Nursing, Critical Care

Nursing, Primary Care Nursing or Psychiatric-Mental Health Nursing. For more information, call 617-437-3125.

College of Pharmacy and Allied Health Professions

Offers programs leading to the Master of Science degree in biomedical science, hospital pharmacy, medical laboratory science, medicinal chemistry, and pharmacology. The Master of Health Professions is offered with four options: general, health policy, physician assistant, and regulatory toxicology. A doctoral

degree program is offered in biomedical science with specializations in medical laboratory science, medicinal chemistry, pharmaceutical sciences, pharmacology, or toxicology. A graduate program in clinical pharmacy, leading to the Doctor of Pharmacy, is also available. For more information, call 617-437-3211.

School of Law

Offers a full-time day program leading to the juris doctor degree. The three-year curriculum includes four quarters of work experience in judges'

chambers, law firms, governmental agencies, and other legal settings. For more information, call 617-437-2395.

Division of Continuing Education

Northeastern University established continuing education programs over twenty-five years ago to provide a practical, high-quality career-related education in business and industry consistent with the University's tradition of adult education. The mission of the division is to be a leader in nondegreed continuing education for the career professional. Courses are taught primarily by practitioners in their respective fields. Program development, courses, and seminars

are based on market needs and wants and are offered at convenient off-campus locations and at company sites. The division continues to enhance Northeastern University's regional and national reputation as a leader in continuing education via such technological advances as microwave and satellite transmission. For further information on the programs that follow, telephone the division office at 617-437-5828.

State-of-the-Art Program

The State-of-the-Art Program offers evening courses, seminars, and on-site training designed for working professionals seeking practical, hands-on education in a job-related area of technology. The curriculum includes: AI/expert systems, high-level computer languages, and certificate programs in data communications, biotechnology, computerized automation technology,

telecommunications, VLSI design, microelectronics/semiconductor science, microwave engineering technology, artificial intelligence, assurance technology, software engineering, and technology management. For further information, telephone the State-of-the-Art Program at 617-329-8000 or 617-320-8000.

Building and Construction Technology Program

Designed for a broad spectrum of professionals either presently in or considering some aspect of the building and construction technologies, the course offerings range from introductory to advanced and are conducted in an intensive, total-immersion setting. Evening courses, on-site training, and seminars include architecture, real estate inspection, construction technology, environmental management, landscaping, construction law

and management, fire protection, engineer-in-training license examination preparation, and Massachusetts electrician's code review. Certificate programs are offered in HVAC systems design, facilities management, construction superintendency, real estate inspection, building and construction technology, and real estate development. For further information, telephone 617-329-8000 or 617-320-8000.

Paralegal Program

The Paralegal Program offers a twelve-week Paralegal Certification Program and specialist courses on specific legal topics such as legal research/writing,

real estate, family law, litigation, and labor law. For further information, telephone 617-329-8000 or 617-320-8000.

Test Preparation Program

The Test Preparation Program offers courses to help prepare for the LSAT, GMAT, and GRE examinations, providing the participant with an

in-depth exposure to the subject matter. For further information, telephone 617-329-8000 or 617-320-8000.

Urban Mass Transit Program

The Urban Mass Transit Program is designed to develop improved methods of meeting unique challenges facing management in the urban mass transportation industry. The goal of

the program is practical education in modern management theory and practice. For further information, telephone 617-329-8000 or 617-320-8000.

Insurance and Financial Services Institute

Established to foster excellence in the insurance and financial services communities in the Boston area, the institute offers courses and seminars in general insurance, risk management,

insurance licensing, and financial services. These study programs assist those seeking to develop or to update professional credentials. For further information, telephone 508-533-5101.

**Network
Northeastern**

Developed to serve the need of the high-technology community for flexible educational and training programs, Network Northeastern broadcasts from the University campus directly to company sites and to the Burlington and Dedham campuses. Live classroom instruction is telecast in color to these sites, where it is viewed in reception rooms equipped with television monitors and a telephone talkback system. Videotapes of missed classes are provided, and a courier service delivers and collects homework assignments and serves as a link to the registrar, bookstore, and other university services.

Network Northeastern offers courses in graduate engineering, computer

science, undergraduate engineering technology, the State-of-the-Art Program, and graphic arts. In 1987, Northeastern became the first university in eastern Massachusetts to install a Ku-band satellite dish. This enables the University to broadcast courses throughout the continental United States and to redistribute live satellite programs to subscribing company sites via the microwave system. Via the satellite, the Network is a local distributor for Institute of Electrical and Electronics Engineers (IEEE) videoconferences and other satellite providers. For further information on Network services, telephone 617-437-5620.

Faculty

*Denotes senior lecturer as of October 1989.

Samy A. Abdel-Baky, Ph.D.

Chemistry

Northeastern University

Barbara Abeles, M.B.A.

Management

Abeles Associates

Kimiko Abramoff, M.A.

Modern Language

Prime Computer

Hon. Herbert Abrams, M.L.*

Criminal Justice and Security

Superior Court of Massachusetts

Michael J. Abruzzese, M.B.A.*

Information Systems

University of Massachusetts

Medical Center

Deborah A. Adair, M.S.

Health Record Administration

Elliott Hospital

Stephen D. Adair, M.A.

Sociology/Anthropology

Northeastern University

Henry Adleman, B.S.*

Information Systems

Digital Equipment Corp.

Anne L. Adrian, L.L.B.

Criminal Justice

Crime & Justice Foundation

Thomas J. Ahern, Jr., J.D.*

Business Law

Silver and Ahern

Joseph Aieta III, M.A.*

History

Lasell Junior College

Edward E. Alessi, M.A.

Sociology/Anthropology

Bedford VA Hospital

Fariba Aliloo, M.S.

Information Systems

City of Cambridge

Angelo S. Allegretto, C.P.A.

Accounting

Carlson Metalcraft Company, Inc.

Israel Aluf, Ph.D.*

Modern Language

Northeastern University

Patricia L. Alves, B.S.

Hotel and Restaurant

Management

Katharine Gibbs

Craig A. Andersen, B.S.

American Sign Language

Self-Employed

Janis L. Anderson, Ph.D.

Psychology

Brigham & Women's Hospital

Paul G. Anderson, M.F.A.*

Art

Artist

R. Wayne Anderson, Ph.D.*

History

Northeastern University

James P. Angelini, Ph.D.

Accounting

Northeastern University

Robert B. Angus, M.S.*

Mathematics

Angus Associates

Mary F. Annas, M.A.T.

Alternative Freshman/English

Stanley S. Antoniotti, M.A.*

Economics

Bridgewater State College

Robert J. Anzenberger, M.P.A.*

Human Resources Management

Bank of Boston

Carol V. Apt, M.A.

Sociology/Anthropology

Alia A. Arasoughly, B.S.

Art

Joan L. Arches, M.S.*

Sociology/Anthropology

Regis College

Joseph T. Arcidiacono, B.S.*

Information Systems

Digital Equipment Corp.

Edward A. Arees, Ph.D.*

Psychology

Northeastern University

Gustavo A. Aristizabal, M.A.

Economics

Northeastern University

John C. Armington, Ph.D.

Psychology

Northeastern University

Stephen F. Armstrong, Sr., M.B.A.*

Purchasing

Varian Associates

Jane Aroian, Ed.D.

Nursing

Northeastern University

Gilbert N. Aronson, M.Ed.

Technical Communications

Bolt Beranek and Newman

Steven A. Aronson, B.S.

Information Systems

The Gillette Company

Judy A. Arraj, Ph.D.

Biology

Emmanuel College

Roger M. Atherton, Ph.D.

Management

Northeastern University

Lynda F. Atkins, M.B.A.

Management

Self-employed

Meredith O. Atkinson, M.A.

English

Marjorie J. Atlas, M.A.

Music

Chris Attaya, M.B.A.

Health Management

Home Care Group, North Shore

Saul H. Auslander, M.B.A.

Finance

Bridgewater State College

Joseph Autilio, J.D.

Political Science

Board of Real Estate Brokers

Alice D. Avakian, M.S.

Biology

Emerson College

John Avakian, M.F.A.

Art

PC. Week

Jason M. Avergun, M.B.A.*

Marketing

York International Corp.

Warren F. Averill, M.S.*

Chemistry

Barnstable High School

Ralph R. Avery, M.S.

Policing

Northeastern University

Nawal Awad, M.A.

Alternative

Freshman/Mathematics

Paula L. Aymer, M.A.

Sociology/Anthropology

Northeastern University

Kenneth P. Ayoob, M.A.

Music

Northeastern University

Virginia Ayoob, M.A.

Music

Hocine Azeni, M.A.

Sociology/Anthropology

Northeastern University

David L. Bachrach, Ed.D.*

Psychology

Boston VA Medical Center

Philip N. Backstrom, Ph.D.

History

Northeastern University

Swaminathan Badrinath, M.B.A.

Finance

Northeastern University

Benjamin Bahan, M.Ed.

American Sign Language

Deborah J. Baiano, B.A.

Alternative Freshman/Sociology

Anthony J. Bajdek, M.A.*

History

Northeastern University

Edward A. Baker, Jr., M.B.A.

Finance

Appex

Edward F. Baker, M.S.

Mathematics

Westwood High School

Errol H. Baker, Ph.D.*

Psychology

Boston VA Medical Center

Charles D. Baker, M.B.A.

Management

Northeastern University

Sara K. Baker, M.S.

Art

Baker Design

Ramaiya Balachandra, Ph.D.

Management Sciences

Northeastern University

Peter S. Baletsa, M.S.*

Biology

Lynn Public School System

George B. Ballester, M.A.

Information Systems

The Boston Company

Kenneth W. Ballou, M.A.

Management

Wellesley Motor Coach Company

Louis E. Banderet, Ph.D.*

Psychology

U.S. Army Research Institute

Brendan Bannister, D.B.A.

Human Resources Management

Northeastern University

Susan T. Bannon, A.S.

Radiologic Technology

Brigham & Women's Hospital

John J. Baranofsky, M.S.*

Management

Raytheon Company

Antonio Barbagallo, D.M.L.

Modern Language

Stonehill College

Ema Barker, M.A.

Modern Languages

Northeastern University

David R. Barkmeier, Ph.D.

Psychology

Bunker Hill Community College

Raymond S. Barnstone, M.B.A.*

Finance

Codex Corp.

Cynthia L. Baron, B.A.

Art

Northeastern University

Robin C. Barr, M.A.

English

Martin J. Barrett, J.D.

Human Resources Mananagement

University of Massachusetts

Medical Center

Barbara R. Barry, Ph.D.

Music

New England Conservatory of

Music

Scott P. Bartis, Ph.D.

Psychology

Lighthouse School

Pam M. Basile, B.S.

Hotel and Restaurant

Management

Tremont House Hotel

Norman D. Bates, J.D.*

Criminal Justice and Security

Northeastern University

William W. Bauser, M.A.

Philosophy/Religion

John P. Bay, B.A.

Drama

Maxine C. Beach, M.A.

Philosophy/Religion

Anthony Beadle, B.A.

Music

Marcus A. Bearse, Jr., Ph.D.

Psychology

Northeastern University

Mark H. Beaudry, M.S.

Security

Westin Hotel

Nancy V. Becker, M.Ed.*

American Sign Language

Northeastern University

Robert Beckett, M.S.

Management Sciences

Digital Equipment Corp.

Judith E. Bedford, M.A.

Music

Judith A. Bednarz, M.S.

Technical Communications

Candela Laser Corporation

Stanley A. Beecoff, M.B.A.*

Management

Cole Hersee Co.

Roger Beer, M.S.

Information Systems

Digital Equipment Corp.

Caroline H. Beetz, M.A.

Economics

Apollo Computer

Richard E. Belanger, B.S.*

Management

Digital Equipment Corporation

Susan B. Belinsky, M.P.A.

Health Management

Laboure College

Denise A. Belisle, B.S.

Health Science

Brigham & Women's Hospital

Diane M. Bellavance, M.B.A.

Marketing

D. Bellavance, Agency

Ralph C. Belmonte, Ed.D.*

Speech Communication

Revere Public Schools

Barbara A. Beltrand, M.A.

Accounting

Lasell Junior College

John Bena, J.D.

Real Estate

Rauech Aronson Shuman

Patricia Bench, M.Ed.

Alternative

Freshman/Mathematics

Richard F. Benedetto, M.A.*

Management

Business & Industry Training

Group

Paula Bennett, Ph.D.*

English

Wendy L. Bennett, B.S.

Radiologic Technology

Children's Hospital

Maria F. Benotti, M.A.

Music

New England Conservatory

Extension

Robin M. Berggren, HS.D.

Radiologic Technology

New England Deaconness

Lisa M. Bergman, B.A.

Art

Northeastern University

Marcia A. Bergman, M.Ed.

Alternative Freshman/Language

Skills

William R. Berkowitz, Ph.D.

Psychology

Dr. H.C. Solomon Mental Health

Mark S. Berman, M.Ed.

Health Management

Lanessa Ext Care Facility

Eugene A. Bernstein, Ph.D.

Biology

Beth Israel Hospital

Samuel J. Bernstein, Ph.D.*

English

Northeastern University

Bruno A. Berszoner, M.A.

Economics

Northeastern University

Said Bhyer, M.Ed.

Sociology/Anthropology

Northeastern University

Henry M. J. Biagi, M.A.

Hotel & Restaurant Management

City of Somerville

Kurt J. Biederwolf, B.A.

Music

Berklee College of Music

Deirdre Bird, Ph.D.

Marketing

Northeastern University

Samuel S. Bishop, M.F.A.*

Art

Northeastern University

Thomas J. Bittihoffer, B.A.

Marketing

Sunshine Biscuits Inc.

Susan Bjorner, M.L.S.

Library Science

Massachusetts Institute of

Technology

Carl Blackman, B.S.*

Accounting

Carl Blackman & Co.

Charmarie J. Blaisdell, Ph.D.*

History

Northeastern University

Lorraine J. Blake, M.A.

Alternative Freshman/History

Robert J. Blanch, Ph.D.*

English

Northeastern University

Dennis Blanchard, M.B.A.

Information Systems

Hills Department Stores

Theodore Blank, Ed.D.*

Health Science

Educational Consultant

Barbara A. Blatner, D.F.A.

Alternative Freshman/English

Carolyn L. Blicht, M.A.*

Sociology/Anthropology

Northeastern University

Lawrence J. Blumsack, M.S.

Drama

Kathleen Bobick, B.S.

Therapeutic Recreation

Tufts University

Phillip E. Bodrock, Ph.D.

English

Index Group Inc.

Phinorice J. Boldin, Esq., J.D.

Real Estate

Attorney General Office

Paul J. Bolster, Ph.D.

Finance

Northeastern University

Vincent C. Borman, M.B.A.*

Transportation

Raytheon Company

Jeffrey Born, M.B.A.

Finance

Northeastern University

Charles R. Botticelli, Ph.D.

Biology

GTE Laboratories

Guy E. Bottiglio, M.S.*

Information Systems

Digital Equipment Corp.

James V. Botto, B.S.

Speech Communication

Compass Inc.

Richard C. Boulanger, Ph.D.

Music

Berklee College of Music

Mark S. Bourbeau, J.D.

Real Estate

Commonwealth of Massachusetts

Alma Bournazian, B.A.

American Sign Language

Massachusetts Commission for

the Deaf

Theodore R. Bousquet, B.S.*

Information Systems

Honeywell Bull Worldwide Infor-

mation Systems

Patricia A. Bowen, M.A.

Speech Communication

John F. Bowes, Jr., M.B.A.*

Information Systems

MBTA

George S. Bowling, Ed.D.*

Human Resources Management

Massachusetts Rehab.

Commission

Robert T. Boyd, M.S.

Mathematics

Town of Winchester

Richard W. Boyden, B.S.

Information Systems

Millbrook Distributors, Inc.

Charles M. Boyer, M.A.

Alternative Freshman/English

Alan Bradshaw, M.S.*

Mathematics

Sun Financial Group

Thomas P. Brady, Jr., M.B.A.*

Accounting

Thomas P. Brady C.P.A.

Mary G. Breed, B.S.

Health Management

Reading School Systems

Barbara Breen, C.P.A.

Accounting

DEA Marwick Main

Marc Bremer, M.B.A.

Finance

Northeastern University

Joseph F. Brennan, Jr., M.S.

Industrial Management

DCASMA

David L. Brett, M.S.

Information Systems

Reading Memorial High School

Caroline B. Bridgeman-Rees, M.A.

History

Retired

Edward J. Brigman, M.A.*

Economics

Self-employed

Barbara K. Britt, B.A.

Human Resources Management

Britt Associates, Inc.

George M. Brooker, M.B.A.*

Economics

Dean Junior College

Miriam G. Brooks, M.F.A.

Art

MIM Brooks Graphic Design

Mary T. Brophy, M.D.

Health Science

Boston V.A. Medical Center

William K. Brothie, M.S.

Chemistry

Belmont High School

James Brough, H.S.D.

English

Self-Employed

Fern M. Brown, M.Ed.

English

VOICES

Sharon D. Brown, M.B.A.

Marketing

Boston Edison

Sharon R. Brown, M.A.

Music

Charles K. Brownlee, J.D.
Criminal Justice and Security,
Massachusetts Trial Court
Division

Ann S. Broyer, B.A.
Women's Career Program
N. S. Stone, Inc.

Gordon L. Brumm, Ph.D.*
Philosophy/Religion

Richard P. Bucci, M.B.A.
Accounting
Self-employed

Debra F. Buckley, M.B.A.
Management
HCHP

Anthony A. Buglio, M.S.*
Speech Communication
The Speech Consultancy

Kenneth R. Buja, B.S.
Transportation
Computer Associates

Bruce Buntin, B.S.*
Human Resources Management
Human Resource Services

Paul Burgoyne, B.S.
Real Estate
Curran Associates

Mary P. Burke, Ph.D.
Political Science

Robert K. Burke, M.B.A.
Information Systems
State Street Bank

Alfred C. Burmeister, M.B.A.*
Information Systems
Digital Equipment Corp.

Pamaja Burrell, Esq., J.D.
Real Estate
Wiley & Richlin

L. Gerald Bursey, Ph.D.
Political Science
Northeastern University

Harvey Burstein, Esq., J.D.
Security
Data General

Charles F. Burt, M.B.A.*
Accounting
H. J. Stabile & Son, Inc.

Karen Buzzard, Ph.D.
Speech Communication

Ronald J. Byrnes, M.B.A.*
Management Sciences
Genzyme

Janice L. Cagan-Teuber, M.Ed.
American Sign Language

Diane P. Caggiano, M.B.A.
Alternative Freshman/Business

John A. Calicchia, Ph.D.
Psychology

McLean Hospital

Linda B. Caliga, M.B.A.

Women's Career Program
Cardinal Cushing Hospital

Bridget K. Callahan, M.A.
Alternative Freshman/English

Joanne M. Callum, M.A.
Speech Communication
Cape Cod Community College

William A. Calore, B.S.
Hotel & Restaurant Management
Rindge Latin School

Charles Calusdian, M.B.A.*
Industrial Management
Raytheon Company

David S. Calverley, Ph.D.*
Psychology
Massachusetts Depart. of Social
Services

Frank R. Campagnoni, Ph.D.
Information Systems
Northeastern University

Ballard C. Campbell, Ph.D.
History
Northeastern University

James A. Canino, M.A.*
Sociology/Anthropology
Northern Essex Community
College

Jananne S. Cannon, M.B.A.
Marketing
Northeastern University

Raymond J. Cannon, J.D.
Human Resources Management
Cabot Corp.

Mira Cantor, M.F.A.
Art
Northeastern University

Edgar T. Canty, M.S.*
Mathematics
Bridgewater State College

Kenneth M. Capobianco, M.A.
English

Northeastern University
Margo R. Capparelli, B.A.

Alternative Freshman/Sociology
Brian R. Caputo, M.B.A.*
Management Sciences
GTE

Donald A. Carbone, M.Ed.
Accounting
Greater Boston Regional
Education Center

Mary T. Carbone, C.A.G.S.
English
Massachusetts Bay Community
College

Anthony M. Carilli, M.A.
Economics
Suffolk University

Olga F. Carito, M.S.
Mathematics
Watertown School Department

Simone M. Caron, M.A.
History
Worcester Polytechnic Institute

Charles J. Carr, M.B.A.*
Accounting
The New Can Co., Inc.

Janet H. Carr, M.A.
English
Northeastern University

Joanne Carr, M.S.
Earth Science
Rural Housing Improvements

William F. Carr, LL.B.*
Business Law
Puopolo & Carr, P.C.

J. Christopher Carroll, M.S.
Journalism
William S. Carroll, Esq., J.D.*

Health Management
Bouditch & Dewey

Norman J. Carlmill, M.B.A.*
Management
Carnor Incorporated

Paula C. Caruso, Ph.D.
Alternative Freshman/Language
Skills

Michelle Casario, M.A.
Economics
Northeastern University

Robert W. Casey, M.Ed.
Speech Communication
Burlington High School

Margaret P. Casper, Ph.D.*
Mathematics
King Philip Regional Schools

Christopher L. Cass, M.A.
Sociology/Anthropology
Badger Engineers, Inc.

Edward C. Cass, Ph.D.
History
Northeast Consultants

Sharron G. Cassavant, Ph.D.
English
Greer Publications

Christopher J. Cassidy, M.S.*
Information Systems
Northeastern University

Richard Castle-Walsh, M.B.A.
Women's Career Program
 Bethlehem Steel Corp.

David Cavalier, M.H.A.
Health Management
 Commonwealth of Massachusetts

Paul D. Cayer, M.B.A.
Finance
 Building #19, Inc.

Anthony M. Celata, M.Ed.
Hotel and Restaurant Management
 Somerville Public School System

Linda A. Champa, M.A.
English
 Burdett School

Terry H. Chapman, Ph.D.
Women's Career Program
 Chapman Associates

Sheldon L. Cheek, M.A.
Art
 Northeastern University

Michael D. Chefitz, J.D.
Business Law
 Johnson Schwartzman

Kenneth Chernack, M.B.A.
Information Systems
 Digital Equipment Corp.

Joseph W. Chevarley, Jr., M.P.A.
Management
 Northeastern University

Catherine Chiang, M.A.
Economics
 Northeastern University

Linda Chinsen, B.S.
Radiologic Technology
 New England Deaconess Hospital

John T. Chirban, Ph.D.*
Psychology
 Harvard University

M. Siraydoulah Chowdhury, L.L.M.
Business Law
 Delforesh International

Thomas J. Chuda, M.S.
Criminal Justice and Security
 Massachusetts Criminal Justice Training Council

Anthony Cicerone, M.A.*
Economics
 Bridgewater State College

Gail M. Cirillo, M.B.A.
Alternative Freshman/Language Skills
 Nynex Information Resources

Albert F. Clark, Jr., M.B.A.
Finance
 Clark's Corner, Inc.

Claudia A. Clark, B.A.
Mathematics
 Digital Measurement Systems

Kalo Clarke, M.A.
English
 Northeastern University

Geoffrey Clarkson, D.B.A.
Management
 Northeastern University

Fred W. Clarridge, Jr., M.S.*
Earth Science
 Wellesley Public Schools

James A. Clattenburg, A.B.
Art
 Howard S. Clayman, B.A.

Howard S. Clayman, B.A.
Information Systems
 Dynamics Research Corp.

Hermine M. Cleary, B.S.
Alternative Freshman/Language Skills

Paul F. Cleary, M.A.
Economics
 Occupational Analysis

Paul Clemente, Jr., M.S.
Accounting
 Boston University

Jennifer L. Clifford, M.A.
Economics

William M. Cloran, J.D.*
Criminal Justice and Security
 DiCara, Selig, Sawyer, and Holt

Langdon D. Clough, M.A.
Earth Science
 City of Central Falls

Barbara A. Coarr, B.S.
Medical Laboratory Science

Joseph D. Codispoti, M.S.
Journalism
 Digital Equipment Corporation

Gerald F. Cody, B.A.*
Marketing
 Dean Witter Reynolds, Inc.

Cathy Cogen, M.Ed.*
American Sign Language

William G. Coggan, Ph.D.*
Human Resources Management
 Massasoit Community College

Dennis L. Cohen, M.S.
Political Science
 Dorr & Shett Field Research

Edward H. Cohen, M.S.
Earth Science
 Alliance Technologies Corp.

Edward S. Cohen, M.A.*
Information Systems
 Hampden Automotive Sales

Joseph S. Cohen, M.B.A.
Accounting
 U.S. General Accounting Office

Richard A. Cohen, B.S.
Real Estate
 City of Boston

Robert F. Cohen, B.S.
Accounting
 Self-employed

Robert L. Cohen, M.S.
Accounting

Sharon M. Cohen, M.S.M.E.
Health Record Administration
 Trans-Med

Jaimee W. Colbert, M.A.
English
 Self-employed

Annalee Collins, R.R.A., B.S.*
Health Record Administration
 Northeastern University

Eleanor J. Collins, M.S.
Alternative Freshman/Mathematics

Richard J. Comings, M.A.*
History
 Northeastern University

Sandra M. Conant, M.S.
Nursing
 Northeastern University

Clinton H. Condon, M.B.A.
Real Estate
 Pulsifer & Associates

Gertrude A. Condon, M.Ed.
Criminal Justice and Security
 Services Against Family Violence

Paul C. Condon, M.B.A.
Marketing
 Xyplex Inc.

Elizabeth M. Congdon, M.A.*
History
 Peabody School System

Christine M. Conley, M.F.A.
Art

Spencer F. Conley, B.S.
Journalism
 Spencer F. Conley Associates

Leonard M. Conlin, Sr., M.Ed.*
Mathematics
 Framingham North High School

John F. Connelly, Ph.D.
Information Systems
 Boston Edison Company

Timothy J. Connelly, M.B.A.
Accounting
 Brown Brothers Harriman

Thomas F. Connerty, B.A.*

Information Systems
Prime Computer, Inc.

Patricia D. Connolly, B.S.

Alternative Freshman/Language Skills

Joseph N. Connors, M.P.A.*

Political Science
Mass. Criminal Justice Training Council

Louis E. Conrad, M.S.

Journalism
Northeastern University

John Conway, M.A.

Technical Communications
Jack Conway Associates

Susan Conway

Health Record Administration
Self-Employed

James Cook, A.B.

Management
Northeastern University

Lindsay Cook, M.S.

Accounting
Liberty Mutual Insurance Group

Ellen M. Cooney, M.A.

English
Self-employed

Ronald P. Corbett, Jr., M.S.

Corrections
Massachusetts Trial Court

John S. Corcoran, M.S.

Technical Communications

Elizabeth M. Corea, M.A.

Speech Communication

Peter V. Corea, Ph.D.

Psychology
Emerson College

Norma Corey, E.D.

Alternative Freshman/Language Skills

Steven H. Cornelius, Ph.D.

Music
Pine Manor College

Dyer Cornell, M.B.A.*

Finance
Bank of Boston

Richard S. Corrente, M.B.A.*

Management
Raytheon Company

Leon L. Cort, Ph.D.

Political Science
Wentworth Institute of Technology

Edward V. Cosgrove, Ph.D.*

Biology
Commonwealth of Massachusetts

Angela B. Cossu, M.A.

Sociology/Anthropology

James W. Cottom, M.A.*

History
Massasoit Community College

Jay E. Coughenour, M.B.A.

Finance
Krent/Paffett Assoc.

William J. Coughlan, M.A.

Art
Blue Hills Regional Technical Institute

William G. Coulter, B.S.

Journalism

Robert F. Couture, B.A.

Music

Thomas F. Coveney, M.B.A.*

Information Systems
Stone & Webster Eng. Corp.

Susan J. Cox, M.S.

Biology
Dynamics Research Corp.

Charles C. Cox, III, M.A.

History
Big Alices Inc.

Wallace Coyle, Ph.D.

English
University of Massachusetts

John J. Coyne, M.B.A.

Information Systems

Carol A. Crane, M.S.
Career/College Transition

Self-employed

Steven Crapser, B.A.

Purchasing
The Kendall Company

Bryan D. Craven, B.S.

Information Systems
General Electric Company

Salvatore A. Crisafulli, M.B.A.*

Information Systems
Career Management Assoc.

Robert D. Crofts, M.A.*

Economics
Salem State College

John F. Cronin, Jr., M.B.A.*

Accounting
Raytheon Company

Joseph V. Cronin, Jr., J.D.*

Business Law
Massachusetts Trial Court

Joseph W. Cronin, B.S.*

Management Sciences
Cal Company

Mary A. Cronin, M.B.A.

Human Resources Management
Commonwealth of Massachusetts

Hugh J. Crossland, LL.M.*

Accounting
Ross Crossland Weston and Company

Bernard Crowley, M.B.A.

Finance
Putnam Investment

Brian C. Crowley, M.B.A.*

Accounting
Graftel Systems Inc.

Mark D. Crowley, M.B.A.

Accounting
Autex Systems, Inc.

Patricia L. Culbert, M.F.A.

Drama
Dean Junior College

David M. Culver, Ph.D.*

History
Bridgewater State College

Robert J. Cummings, M.B.A.

Accounting
Fidelity Investment

Edmund Cuoco, B.A.

Technical Communications
Lexicon, Inc.

Helen M. Curley, M.A.*

Criminal Justice and Security

Joseph R. Curley, Jr., M.B.A.

Real Estate
Wm. F. Curley, Jr. Assoc.

Richard Curran, M.B.A.

Finance
New England Telephone

Victor A. Curran, B.A.

Art
D.C. Heath

Joan Curtice, M.A.

Human Resources Management
Micrion Corporation

Robert S. Curtin, Ed.D.

History
Northeastern University

John J. Curtis, M.A.

Music
Emerson College and Northeastern University

Madelyn A. Curtis, M.A.

Music
Northeastern University

Roseann Cutroni, M.S.

Health Science
St. Elizabeth's Hospital

Albert C. D'Amato, M.Ed.*

English
Northeastern University

Miriam F. D'Amato, M.A.*

English
Laventhal-Sidman

Patricia Dacey, M.Ed.

Marketing
Walter Matinson CPA

Maria N. DaCosta, Ph.D.

Economics
Western New England College

Robert E. Daidone, J.D.

Business Law
Ricklets, Uehlein & Son

Carol A. Dalto, Ph.D.*

Psychology
John Hancock

Dennis Daniel, B.A.

Purchasing
Digital Equipment Corp.

Joyce Daniels-Jungman, Ph.D.

Alternative Freshman/English

Bonnie S. Dann, B.F.A.

Art
Rosemarie A. Danner, B.A.

Accounting
Coopers & Lybrand

Ann M. Davey, B.S.

Real Estate
Davey Associates

Ellen Davey, Esq., J.D.

Real Estate
Davey & Davey

Mary Davey, Esq., J.D.

Real Estate
Davey & Davey

Francis L. David, M.Ed.

Industrial Management
Digital Equipment Corp.

Edward S. Davidson, B.S.

Human Resources Management
Federal Labor Relations Authority

Lawrence J. Davis, M.B.A.

Information Systems
Gorton's of Gloucester

Robert E. Davis, M.B.A.

Accounting
R.E. Davis and Assoc.

James D. Dawson, Ph.D.

Alternative Freshman/History

Marilyn L. Day, M.A.

English
Marblehead High School

Robert De Vries, M.A.

Music
The New School of Music

Bruce A. Dean, J.D.

Criminal Justice and Security
Self-employed attorney; Security
Consultant

Lance M. Dean, M.A.

Alternative Freshman/English

Peter U. Decenzo, B.S.

Mathematics
Ashland High School

Peter F. DeCosta, M.S.

Earth Science
United States Army

Paul DeCristofaro, M.B.A.

Accounting
P J C CPA

Anne-Marie Delavnay, B.A.

Modern Language

George Delianides, M.B.A.

Marketing
Dennison Mfg. Co.

Joyce Delorey, M.A.

Alternative
Freshman/Mathematics
Northeastern University

David A. Deluca, J.D.

Criminal Justice and Security
Murphy, Hesse, Toomey, & Lehane

John B. Deluca, J.D.

Business Law
Data General Corporation

Robert J. Dennehy, M.B.A.*

Accounting
Robert J. Dennehy, C.P.A.

Paul J. Derby, M.B.A.*

Information Systems
Honeywell, Inc.

Joseph B. DeRoche, M.F.A.*

English
Northeastern University

Stephen R. Derosier, M.B.A.

Management
Northeastern University

Ernest P. DeSimone, J.D.

Real Estate
McNamara and DeSimone

Carl F. DeSisto, M.S.

Transportation
Stone and Webster Engineering
Corp.

Normand J. Des Marais, M.B.A.

Purchasing
Honeywell

Margaret D. Devaney, M.Ed.

English
Braintree High School

Peter B. Devaney, M.A.

Real Estate
Comm Land Title Ins.

Richard K. Deveney, M.Ed.

Mathematics
Jamaica Plain High School

James D. Devlin, B.S.

Marketing
Digital Equipment Corporation

Emily Dexter, M.A.

American Sign Language
Northeastern University

Brian S. Dextradeur, B.S.*

Management Sciences
Polaroid Corp.

Joanne C. Di Francesco, M.B.A.

Marketing
Mass Bay Community College

Jeffery E. Di Iuglio, M.A.

English
Francis J. Di Sabatino, M.A.*

Chemistry

Retired

Augusto Diana, M.A.

Sociology/Anthropology
Northeastern University

Norma M. Diandrea-Alfonso, B.A.

Radiologic Technology
University Hospital

John Diffenbach, D.B.A.

Information Systems
Northeastern University

Daniel E. Dilorati, J.D.

Real Estate
Department of Attorney General

Howard T. Dimmick, M.Ed.*

Earth Science
Town of Stoneham

Indralakshmi Din-Dayal, M.S.

Speech Communication
Rosemarie M. Dittmer, M.A.*

English

Judith R. Dituri, M.A.*

English

Rose A. Doherty, M.A.

English
Northeastern University

Mark Domaszewicz, M.S.E.E.*

Mathematics
Raytheon Company

Frederick Donahoe, J.D.

Real Estate
Donahoe Associates

Marie L. Donahue, M.A.

Policing
Boston Police Department

Sean F. Donahue, J.D.

Real Estate
Attorney Peter Flynn

Diane M. Donatio, M.S.
English
 West Suburban Elder Services

Kathryn Donegan, B.S.
Information Systems
 Textron Defense System

Jane A. Donnelly, M.A.
Speech Communication
 J. E. Burke High School

Rosemary T. Donnelly, Ed.D.
English
 Stratus Computer

Timothy R. Donovan, Ph.D.*
English
 Northeastern University

Edward M. Dormady, B.A.
Information Systems
 Mast Industries

Michael C. Dornan, M.A.
Sociology/Anthropology

Lynn E. Dornink, M.A.
Alternative Freshman/English

Nadine V. Dowling, M.B.A.*
Human Resources Management
 Emerson College

Nancy L. Dowling, M.Ed.*
Alternative Freshman/Language Skills
 Northeastern University

Margaret A. Downey, M.A.
English

Ronald Draper, M.B.A.
Management Sciences
 Gillette

Joan F. Drexelius, Ph.D.*
Speech Communication
 Northeastern University

Claire Driscoll, M.A.*
Alternative Freshman/Mathematics

James J. Driscoll, M.B.A.
Accounting
 Ernst & Young

James L. Driscoll, M.B.A.
Accounting
 Coastway Credit Union

John M. Driscoll, M.A.
Economics
 U.S. Postal Service

William Driscoll, Ph.D.
Accounting
 Internal Revenue Service

David C. Dronsick, M.A.*
Earth Science
 Commonwealth of Massachusetts

Neil F. Duane, M.S.
Technical Communications
 Boston Documentation Design

Diana E. Duarte-Constock, B.A.
Art
 Transcriber Company Inc.

Edward L. Dube, M.B.A.*
Management
 ELD Associates

Catherine Dube-Fortin, Ph.D.
Technical Communications
 Center for Alcoholic Studies

James Ducey, M.B.A.
Accounting
 Morgan Memorial Goodwill Indus.

Gary L. Duehr, M.F.A.
English

D. Kerry Dugan, M.Ed.
Information Systems

Terrance J. Dugan, M.B.A.*
Finance
 Ameskeag Inc.

Paula Duggan, M.S.A.
Accounting
 Federal Home Loan Bank of Boston

Daniel T. Dunn, Jr., D.B.A.*
Marketing
 Northeastern University

Laura W. Dunn, M.A.
English

Edward A. Duprez, Jr., M.B.A.*
Management
 Emmanuel College

Douglas F. Durant, M.F.A.
Music
 Northeastern University

Stephen Durkin, Esq., J.D.
Business Law
 Law Offices of Robert Karns

Paul J. Duval, M.B.A.*
Information Systems
 Commonwealth of Massachusetts

Barbara Dvorchak, M.S.
Mathematics
 Northeastern University

Thomas Dwyer, M.B.A.
Management
 Self-Employed

William C. Dwyer, M.B.A.
Management
 William C. Dwyer Associates

Joann L. Dzink-Fox, M.S.
Health Science
 Forsyth Dental Center

Carl W. Eastman, M.A.*
Speech Communication
 Northeastern University

Mark A. Edelman, M.B.A.
Marketing
 H. Cabot & Co.

William T. Edgett, M.A.*
Human Resources Management
 Northeastern University

Gary A. Edwards, M.B.A.
Accounting
 Self-employed

Richard K. Edwards, M.A.
Sociology/Anthropology
 Pine Manor College

Andrew E. Efstathiou, B.A.*
Information Systems
 Commonwealth of Massachusetts

Kathryn A. Efstathiou, B.A.
Information Systems

David M. Ehrmann, B.S.
Speech Communication

Luckson E. Ejofodomi, Ph.D.
History

Abdelmoujib El-Mernissi, M.S.
Alternative Freshman/Mathematics

James H. Elgin, M.B.A.*
Information Systems
 Digital Equipment Corp.

Irene A. Elios, H.S.D.
Art

Susan J. Engelman, A.S.
Radiologic Technology
 University Hospital

Louis J. Ennis, M.B.A.*
Human Resources Management
 Brandeis University

Binnur Ercem, M.A.
Sociology/Anthropology
 Northeastern University

Fahri Ercem, M.A.
Sociology/Anthropology

Ali S. Errishi, Ph.D.
Philosophy/Physics
 Fitchburg State College

Virginia Eskin, M.A.
Music
 Northeastern University

Herbert J. Eskot, Ph.D.*
Economics

Hassanali Espahbodi, Ph.D.
Economics

Ugo E. Evangelista, M.S.
Mathematics
 Revere School System

Richard P. Evans, M.Ed.
Human Resources Management
 Management Collaborative

Robert M. Fahey, M.Ed.*
Information Systems
 Nixdorf Computer Corp.

Eugene F. Fallon, M.B.A.*
Finance
 GenRad, Inc.

Thomas J. Fallon, M.B.A.
Marketing
 Digital Sales Associates

Edward J. Falvey, M.B.A.*
Management
 Keystone Group

Ghodratallah Farahani, M.A.
Political Science
 Boston University

Clarence Farr, Jr., M.B.A.
Information Systems
 General Electric

Richard J. Faulstich, A.B.
Human Resource Management
 Raytheon Company

Joseph R. Favaloro, M.B.A.
Finance
 Bank of Boston

Beda M. Federici, B.S.
Radiologic Technology

Trudi R. Feinstein, Ph.D.
Psychology

Eileen Feldman, M.A.
English
 Self-employed

Indira E. Fernandes, M.S.
Biology
 Northeastern University

William M. Ferney, M.Ed.
Therapeutic Recreation
 Valle Mgt. Assoc.

George F. Ferrar, M.S.
Art
 Art Institute

Elizabeth M. Ferrarini, M.S.
English
 Northeastern University

James F. Ferreira, M.B.A.*
Information Systems
 Technical Aid Corp.

James E. Ferrier, M.S.
Criminal Justice and Security
 Northeastern University

James J. Ferriter, M.B.A.*
Health Management
 Industrial Medical Center

William A. Ferson, M.A.*
Economics
 U.S. Department of Labor

George W. Fiddler III, M.B.A.
Accounting
 Textron Corp.

Stephen L. Fielding, Ph.D.
Sociology/Anthropology

Barbara Ann P. Filo, Ph.D.*
History
 Bank of New England

William D. Finan, Ed.D.*
Mathematics

Charles A. Findley, Ph.D.*
Speech Communication

Francis X. Finigan, M.Ed.*
Educational Consultant

Joseph L. Finigan, M.Ed.
Mathematics
 Reading Memorial High School

Thomas F. Finigan, B.A.
Management
 Social Security Administration

Frederick B. Fink, M.B.A.
Marketing

Kenneth Finkelstein, Ph.D.
Earth Science
 National Oceanic and ATM
 Administration

Albert J. Finney, Jr., B.S.*
Accounting
 Raytheon Company

Susan L. B. Fintonis, J.D.
Management
 Endicott College

Harold R. Fisher, J.D.
Information Systems
 Commonwealth of Massachusetts

Marjorie Fisher, B.S.
Health Record Administration
 Harvard University Health
 Services

William H. Fisher, M.A.
Criminal Justice and Security
 Massachusetts Department of
 Mental Health

James E. Fitzgerald, M.A.
Modern Language

Leo J. Fitzgerald, M.B.A.*
Management
 General Electric Co.

J. Joseph Fitzsimmons, M.B.A.*
Management
 Polaroid Corp.

Roberta Fitzsimmons, J.D.
Business Law
 Law Offices of Roberta
 Fitzsimmons

John M. Flaherty, B.S.
Accounting
 Blue Cross/Blue Shield

Ruth W. Flaherty, M.B.A.
Human Resources Management
 State Senate

James T. Flanagan, M.P.S.
Sociology/Anthropology

Kevin J. Fleese, B.A.
American Sign Language

Frances B. Fleming, B.F.A.
Art
 Frances Fleming, Graphic Design

William P. Fleming, M.B.A.
Marketing
 Goddard Hospital

Anne Fletcher, M.A.
Drama

Myrtle R. Flight, Esq., J.D.
Health Management
 Self-employed

David E. Floreen, M.P.A.*
Political Science
 Massachusetts Bankers
 Association

Edith E. Flynn, Ph.D.*
Criminal Justice and Security
 Northeastern University

Gregory L. Flynn, M.A.
English
 Boston University

Leo M. Flynn, M.B.A.*
Real Estate
 Leo Flynn, R.E. & Appraising

Peter E. Flynn, J.D.*
Real Estate
 Flynn Realty, Inc.

Thomas J. Flynn, J.D.
Human Resources Management
 Thomas J. Flynn & Assoc.

William B. Flynn, Ph.D.*
Psychology
 Merrimack Valley Counseling
 Assoc.

William J. Folan, B.A.
Journalism
 The Patriot Ledger

Philip S. Fogelman, M.A.
Alternative Freshman/English

Audrey J. Folan, B.A.
Mathematics
 Northeastern University

Mary J. Folery, M.S.
Health Science
Youville Hospital & Rehab.

Robert E. Foley, M.B.A.
Finance
Self-Employed

Murray Forbes, M.F.A.
Art

Navigator Foundation

Anthony F. Ford, Ph.D.
Modern Language
Northeastern University

Jacqueline M. Fortier, M.A.
Psychology

McLean Hospital

Armand L. Fortin, B.S.
Purchasing
Honeywell, Inc.

Christopher C. Foss, M.A.
Alternative Freshman/English

James Foss, Jr., LL.B.*
Human Resources Management
Federal Mediation and Counseling Services

Douglas G. Foster, M.Ed.*
Earth Science
Catholic Memorial High School

Gale P. Foster, B.S.*
Marketing
Foster & Associates

Charles F. Fountain, M.S.
Journalism
Northeastern University

William M. Fowler, Ph.D.*
History

Northeastern University

Robert M. Fox, M.B.A.*
Marketing
Gerber Electronics

Walter Fox Tree, M.A.T.*
Art

University of Massachusetts

Laura L. Frader, Ph.D.
History

Northeastern University

Thomas B. Francis, Jr., M.P.A.*
Human Resources Management
City of Boston

Audrey K. Frank, M.S.W.
American Sign Language

Harriet Fraser, M.Ed.
Alternative Freshman/Language Skills

Rosemary Frasso-Jaramilo, A.S.
Radiologic Technology
Children's Hospital

Robert L. Frazier, M.A.
Philosophy/Religion
Howard H. Freedman, M.S.*

Accounting
Raytheon Company
Paula M. French, M.B.A.
Management
Northrup Corporation

John H. Friar, Ph.D.
Marketing
Northeastern University
Melvin W. Friedman, M.B.A.*
Management

M. W. Friedman Associates

Kurt M. Frim, M.B.A.
Management
General Electric Aerospace

Ingeborg Fulepp, M.A.
English

Robert L. Fulford, B.S.
Purchasing
Varian/Extrion

Vincent J. Furlong, M.A.*
Industrial Management
Defense Supply Agency

Mira A. Furth, M.B.A.
Career/College Transition
Furth Associates

W. Arthur Gagne, Jr., M.B.A.*
Management
Business & Industry Training Grp. Inc.

Christine W. Gailey, Ph.D.
Sociology/Anthropology
Northeastern University

Nona Gainsforth, B.A.
Music

Self-employed
Esther M. Gallagher, D.M.D.*
Health Science
Tufts University

Richard R. Gallagher, M.Ed.
Information Systems
Marshfield High School

Kenneth G. Galli, M.S.
Earth Science

Gate of Heaven School
Mary E. Gamerman, B.A.

Biology
Northeastern University

Laura Ganino, B.F.A.
Art

Autographix Inc.

Gloria J. Gannaway, Ph.D.
Alternative Freshman/English

David A. Gardner, Ph.D.
Technical Communications
Lotus

John F. Garvey, M.B.A.
Alternative Freshman/English

Martin J. Gately, J.D.
Real Estate
Flynn Real Estate

Paul C. Gay, J.D.*
Business Law
Harrison & McGuire

Jonathan M. Geer, B.S.
Earth Science
Commonwealth of Massachusetts
Department of Environmental Management

Sandra E. Geer, M.Ed.*
Psychology

Louis C. Generazzo, M.A.
Art
New England Met. Regional Vocational High School

Leanne M. George, B.A.
Art
Self-employed

Anne M. Germain, Ph.D.*
Information Systems
Self-employed

Jeannette Gaerzon, M.B.A.
Career/College Transition

Ara Ghazarians, M.A.
Sociology/Anthropology
The Zaryan Institute

David M. Ghazil, M.B.A.
Human Resources Management
Honeywell

James G. Giammarinaro, M.B.A.
Finance
Dennison Manufacturing Company

Dominic Giarratani, J.D.
Real Estate
U.S. Postal Service

Adrian T. Gilbert, M.S.
Biology
Northeastern University

Katherine L. Gilbert, B.A.
Sociology/Anthropology

Northeastern University

Robert E. Gilbert, Ph.D.
Political Science

Northeastern University
Mary L. Gill, M.A.
Health Management
Blue Cross/Blue Shield

La Rue W. Gilleland, M.A.*

Journalism

Northeastern University

Ruth Gilleran, M.B.A.

Accounting

The Gillette Company

William J. Gillespie, Ph.D.

Therapeutic Recreation

Northeastern University

Louis F. Giorgetti, M.S.

Medical Laboratory Science

Milton Medical Lab

Alan B. Gladstone, B.S.*

Accounting

Alan Gladstone, CPA

Meryl Glatt-Rader, M.Ed.

Career/College Transition

Brandeis University

James L. Glinos, M.Ed.*

Human Resources Management

Glinos Associates

Barbara L. Glover, J.D.

Business Law

Victor B. Godin, D.B.A.

Information Systems

Northeastern University

Robert M. Gogan, Jr., M.A.

English

Mount Ida College

Maureen D. Goggin, M.A.

English

Northeastern University

Peter N. Goggin, M.A.

Alternative Freshman/English

Meryl Goldberg, M.A.

Music

Robert L. Goldberg, M.B.A.*

Management

Business Industry Training Grp.

Daniel Golden, Ph.D.

English

Wheaton College

Kenneth E. Golden, M.B.A.

Information Systems

Prime Computer, Inc.

Frederick T. Golder, Esq., LL.M.*

Human Resources Management

Self-employed

Stan Goldman, J.D.*

Political Science

Massachusetts Department of

Mental Health

Charles W. Goldsmith, J.D.

Journalism

United Press International

Harold M. Goldstein, Ph.D.

Economics

Northeastern University

M. Alvin Goldstein, A.B.*

Information Systems

Consultant

Robert J. Goldstein, M.A.*

Sociology/Anthropology

Susan J. Goldwitz, A.M.

English

City of Cambridge

Maria G. Gonzalez-Rivera, B.A.

Economics

James I. Goodman, B.S.

Accounting

Digital Equipment Corp.

Stephen Goodyear, M.A.*

Modern Language

Daniel D. Gordon, M.A.*

Economics

Salem State College

Robert L. Gore, M.S.

Radiologic Technology

Carney Hospital

Myron S. Goretsky, Esq., J.D.

Hotel and Restaurant

Management

New Hampshire Technical
Institute

Michael F. Gormley, M.B.A.

Accounting

Digital Equipment Corp.

Mary Jane Gorton, M.Ed.*

Art

Babson College

Leslie C. Gosule, B.S.*

Accounting

Leslie C. Gosule & Company

Daniel Z. Gould, M.B.A.*

Industrial Management

GTE

Helen F. Gould, M.S.

Nursing

VA Outpatient Clinic

Leroy Gould, B.S.

Information Systems

Polaroid

Frank S. Govern, M.S.

Health Management

JCRT Harvard Medical School

Saeed Gozashti, M.S.

Chemistry

Northeastern University

David F. Grace, C.A.G.S.*

English

Mount Ida College

William E. Grady, M.B.A.*

Industrial Management

Grady & Associates

Robert Granfield, M.A.

Sociology/Anthropology

Northeastern University

Daniel J. Grant, Jr., M.A.

Art

Fitchburg State College

William H. Grass, M.A.

Music

N.E. Conservatory of Music and
Boston University

Sandra M. Grasso, M.S.

Biology

Lesley College

Leon S. Graubard, M.A.*

Economics

Worcester Polytechnic Institute

Albert E. Gravelle, M.P.A.

Transportation

Mass Bay Transportation
Authority

Alec Grey, J.D.

Real Estate

Arthur M. Graziano, B.S.

Human Resources Management
Marses Foodmart

Harvey Green, Ph.D.

History

Northeastern University

Lewis Greenberg, M.A.

Psychology

Northeastern University

John T. Gregg, B.A.*

Real Estate

Beal & Company

Kristo A. Gregory, M.B.A.*

Finance

Prudential Bache Securities

Ann M. Grennell, M.A.

Alternative Freshman/History
Boston College

Ralph Grieco, M.B.A.

Accounting

Northeastern University

Gerald R. Griffin, Ph.D.*

English

Northeastern University

Julia A. Griffin, Ph.D.

Music

Northeastern University

John L. Griffith, B.S.*

Management

State Department of Environmen-
tal Management

Randall P. Grometstein, J.D.
Business Law
Donna P. Grosjean, B.S.
Biology
 Brigham & Women's Hospital
Abraham Grungold, M.B.A.
Health Management
 U.S. Department of Labor
Cherif Guenoune, M.A.
Sociology/Anthropology
Ronald E. Guittarr, B.S.*
Human Resources Management
 Retired
Anthony J. Gully, M.A.
Sociology/Anthropology
 District Court
Margaret E. Gundal, M.A.
Alternative
Freshman/Mathematics
Roland D. Gunn, M.A.
Philosophy/Religion
Herbert R. Haber, M.A.
English
 Useable Portable Publications
 Inc.
Katherine K. Hacker, M.B.A.
Management
 Sheraton Corporation
James Haddad, B.S.
Mathematics
 Scituate Post Office
Joanna Hadjicostandi, Ph.D.
Sociology/Anthropology
 Northeastern University
William T. Hadley, B.S.
Marketing
 The Hadley Company, Inc.
James W. Haeffner, M.B.A.
Radiologic Technology
 Goddard Memorial Hospital
Vivian M. Haggis, M.S.
Information Systems
 Haggis Consulting
Arthur M. Hogopian, B.A.
Journalism
 Lawrence-Eagle-Tribune
George W. Hahn, M.A.T.
Earth Science
 New England Marine Educational Services
Kenneth W. Hale, M.B.A.
Accounting
 TA Communications Parenters
John P. Haley, C.A.G.S.
Information Systems
 City of Revere

Jay A. Halfond, Ph.D.
Management
 Northeastern University
Caroline G. Hall, B.A.
Real Estate
 Law Offices of Peter Flynn
Raymond C. Halliday, M.A.
Alternative Freshman/English
Paul M. Halloran, B.S.*
Information Systems
 Raytheon Company
Susan C. Hammond, M.S.A.
Accounting
 Self-employed
Suzanne L. Hamner, M.A.
Alternative Freshman/History
William F. Hancock, Jr., M.B.A.*
Finance
 Digital Equipment Corp.
Carolyn Haneke, B.A.
Technical Communications
 Self-employed
Ellen M. Hanick, M.P.A.
Art
Phyllis M. Hanlon, M.Ed.
Alternative
Freshman/Mathematics
Christine M. Hannula, B.A.
Technical Communications
 Wang Laboratories
Robert A. Hannula, M.A.
Technical Communications
 Digital Equipment Corp.
Joseph J. Hansen, M.B.A.*
Mathematics
 Raytheon Company
Norman E. Hansen, M.B.A.*
Marketing
 Endicott College
Richard A. Hargreaves, M.A.
Mathematics
 Westwood High School
James Hargrove, J.D.
Real Estate
Priscilla G. Harmel, M.Ed.
Drama
David J. Harrigan, M.B.A.*
Management Sciences
 D. J. Harrigan Associates
Pamela Harrigan, B.S.
Radiologic Technology
 Massachusetts General Hospital
Andrew E. Harrington, M.A.
English
 Boston University

Paul E. Harrington, M.S.
Economics
 Northeastern University
Raymond P. Harrington, Ph.D.
Alternative Freshman/History
Perry H. Harris, B.A.
Information Systems
 Self-employed
Ruth Ann M. Harris, Ph.D.*
History
 Northeastern University
Thomas M. Hart, M.S.*
Accounting
 U.S. Treasury
Harold Harutunian, Ph.D.*
Mathematics
 Salem State College
Ruth Harutunian, C.A.G.S.
Mathematics
 Watertown School Department
Mohammad S. Hasan, M.A.
Economics
 Northeastern University
Robert T. Hashimoto, M.A.
English
Martha S. Hassell, B.A.
Art
 New England School of Photography
Donald R. Hayden, B.S.*
Information Systems
 Digital Equipment Corp.
David W. Hayes, Esq., LL.M.
Political Science
 The Seiler Corporation
Kathleen H. Hayes, M.Ed.
Career/College Transition
 Northeastern University
Robert T. Heald, M.B.A.*
Accounting
 Heald Hoffmeister and Co.
Anthony D. Healey, J.D.
Real Estate
 Kirkland Group
A. Robert Heanue, B.A.
Management
 Heanue Management Services
James L. Hearn, M.B.A.
Health Management
 Commonwealth of Massachusetts
Barbara A. Heffner, M.S.
Technical Communications
 McGlinchey and Paul
F. Timothy Hegarty, Jr., J.D.
Real Estate
 Norfolk & Dedham Fire Ins. Co.

Stephen J. Heinen, B.A.
Psychology
 Northeastern University

Louise H. Hekimian, M.B.A.
Management

Barry L. Heller, M.S.M.E.
Art
 Heller Associates

Karin S. Hellmer, M.Ed.
English
 Xyvision

Les K. Hemmings, M.Ed.
Management
 John Hancock

Dyke C. Hendrickson, B.A.
Journalism
 Boston Herald

George S. Hennessy, M.B.A.*
Marketing
 Xyplex

Gerald H. Herman, M.A.*
History
 Northeastern University

Robert F. Heron, Ed.D.
English
 Belmont Public Schools

Kathleen M. Herr, Ph.D.
Political Science
 Department of Public Health

George M. Herrick, M.B.A.*
Finance
 CPA

Deborah P. Hetherington, M.B.A.
Alternative Freshman/English

Wayne C. Heward, B.S.
Human Resources Management
 Northrop Corp.

Jennifer N. G. Hicks, M.A.
English

Chester W. Higgins, Ph.D.*
Management

Mark P. Higgins, J.D.
Business Law
 First Service Bank

R. B. Higgins, Ph.D.
Management
 Northeastern University

Kenneth Hill, B.A.
Real Estate
 Hill Brothers Real Estate and Insurance

Lloyd H. Hill, J.D.
Human Resources Management
 City of Quincy

Lois A. Hill, M.E.D.
Alternative Freshman/Language Skills

Malcolm D. Hill, Ph.D.
Earth Science
 Northeastern University

Stephen A. Hiltz, M.A.
Alternative Freshman/History

James R. Hindman, M.B.A.*
Human Resources Management
 Northrop Corp.

David L. Hinds, J.D.
Criminal Justice

William G. Hines, B.S.
Marketing
 Douglas, Hines and Sweeney

Jennifer B. Hintlian, B.A.
Art

David C. Hirschy, Ph.D.
Technical Communications
 Massasoit Community College

Leslie P. Hitch, M.B.A.
English
 Babson College

Susan A. Hoar, M.A.
Alternative Freshman/English

Christine L. Hobart, D.B.A.*
Human Resources Management
 Retired

Ann P. Hobson, M.S.
Nursing
 Savitz & Wainger

Mark O. Hodgson, M.A.
Sociology/Anthropology

Lee Ann Hoff, Ph.D.
Nursing
 Northeastern University

Therese M. Hofmann, M.A.*
Speech Communication
 Simmons College

Barbara Holbrook, M.Ed.
Career/College Transition
 Norwell Public Schools

Arthur D. Holder, M.B.A.
Alternative Freshman/Language Skills

Sherrie V. Holder-Watts, B.S.
Human Resources Management
 Putnam Companies, Inc.

Lisa M. Holt, M.A.
Speech Communication

Marcy Honigbaum, B.F.A.
Art
 Empire Clothing

Stuart Hooten, A.S.
Radiologic Technology
 Brigham & Women's Hospital

Morris Horowitz, Ph.D.
Economics
 Northeastern University

Geralyn Horton, M.A.
Alternative Freshman/Language Skills

John W. Hosmer, Jr., M.B.A.
Finance
 Boston Five Cent Savings Bank

Paul M. Hostovsky, B.A.
American Sign Language
 Deaf-Blind Contact Center

Susan W. Hostovsky, B.A.
American Sign Language
 Northeastern University

John J. Houlihan, M.S.
Policing
 Middlesex District Attorney's Office

Elizabeth P. Howard, Ph.D.
Nursing
 Northeastern University

Martin J. Howard, M.B.A.*
Accounting
 Boston University

Jane A. Howe, M.A.
Sociology/Anthropology

Jane T. Howe, M.B.A.
Finance

Nancy S. Howes, M.Ed.
Therapeutic Recreation
 Cardinal Cushing School

Charles L. Hoyt, M.A.
English
 Cinema Film Consultants

Jack E. Hoza, B.A.
American Sign Language

George B. Hrabec, M.S.
Medical Laboratory Science
 Whidden Memorial Hospital

Margaret C. Huff, Ph.D.
Philosophy/Religion

Anthony H. Hull, Ph.D.*
History
 University of Massachusetts/Boston

William H. Hulsey, J.D.
Business Law
 Northeastern University

Lawrence D. Humphrey, J.D.
Human Resources Management
 Department of Education

Thomas K. Humphreys, M.A.
Economics
 Kidder Peabody & Co.

Theo G. Hunte, M.A.
Marketing

Philip M. Hurdle, M.B.A.
Management
 McLean Communications, Inc.

Robert H. Hutchins, B.A.

Journalism
Interleaf Inc.

Linda A. Hyde, B.S.

Health Record Administration
Mediqual Systems, Inc.

Steven Incropera, M.B.A.

Industrial Management
Digital Corp.

Peter J. Ingeneri, Sr., M.Ed.

Mathematics
Retired

Hon. John J. Irwin, Jr., J.D.*

Criminal Justice and Security
Massachusetts Supreme Court
Justice

Muhammad F. Islam, M.A.

Economics

Nurul Islam, M.S.

Economics
Northeastern University

Herbert H. Itzkowitz, M.B.A.*

Accounting
Forman, Itzkowitz & Berenson,
P.C.

Carl J. Izzo, B.S.

Real Estate
Bank of Boston

Judith Jack, B.A.

Technical Communications

Charles E. Jackson, B.A.

Marketing
New England Advertising Week

Marilyn L. Jackson, B.A.

Journalism
Northeastern University

Stephen Jackson, M.S.

Earth Science
Stoneham Public Schools

Donald M. Jacobs, Ph.D.

History
Northeastern University

Joshua R. Jacobson, Ph.D.

Music
Northeastern University

Thomas E. Jaillet, M.A.*

Mathematics
Tabor Academy

Richard A. James, M.B.A.

Human Resources Management
Uniglobe Advantage Travel

Linda F. Jamieson, Ph.D.

Marketing
Northeastern University

Michael A. Jamison, M.S.

Purchasing
Varian Associates

Paul A. Janell, Ph.D.*

Accounting
Northeastern University

Bonnie S. Jefferson, Ph.D.

Speech Communication
Boston College

Stephen W. Jefferson, Ed.D.

Corrections
Ruffin Society

Richard K. Jeffery, Jr., J.D.

Real Estate
Law Offices of Peter Flynn

Annette S.L. Johansson-Los, M.A.

Speech Communication
Harvard University

Carson C. Johnson, Jr., Ph.D.*

Psychology
Emmanuel College

Richard F. Johnson, Ph.D.*

Psychology
U.S. Army Research Institute

Robert F. Johnson, J.D.*

Criminal Justice and Security
First Security Service Corp.

Rosaleen M. Johnson, M.A.

Mathematics
Algonquin High School

James R. Johnston, B.S.

Real Estate
Equitable Real Estate

David M. Jouffaian, Ph.D.

Economics
Massachusetts Department of
Revenue

John Joyce, M.A.

Mathematics
Winchester Public Schools

Philip C. Joyce, M.A.

Speech Communication
Curry College

Robert L. Jumper, C.P.A.

Accounting
Robert L. Jumper, CPA

Betty F. Kadis, M.B.A.

Management

Mark A. Kagan, B.A.

Music

Mark H. Kaizerman, M.B.A.

Accounting
IDS Financial Services

Katherine M. Kalliel, Ed.M.*

Career/College Transition
Roger Williams Hospital

Martin J. Kane, M.B.A.*

Purchasing
Raytheon Company

Edward M. Kaplan, M.S.*

Information Systems
Massachusetts General Hospital

Mort S. Kaplan, M.A.*

English/Drama
Northeastern University

Joan M. Kapolchok, M.P.A.

Human Resources Management
Department of Personnel

Administration

Steven D. Karchmar, M.S.

Human Resources Management
Wyman-Gordon Co.

Charles Karis, Ph.D.*

Psychology
Northeastern University

Ann C. Karnofsky, M.A.

Music

Barbara C. Kasselmann, B.A.

Alternative Freshman/Language
Skills

Lloyd J. Katz, M.B.A.

Marketing
Pine Manor College

Ralph Katz, Ph.D.

Human Resources Management

Margaret E. Kauffmann, B.A.

Art
Buckingham Browne & Nichols

Maurice Kaufman, Ph.D.

Education
Northeastern University

William D. Kay, Ph.D.

Political Science
Northeastern University

Walter E. Kearney, M.B.A.*

Accounting
Northeastern University

John S. Kearns, Ph.D.

Psychology
Mount Ida College

Daniel J. Keating, Esq., J.D.

Real Estate
Davey & Quinlan

John Keating, M.S.

Alternative
Freshman/Mathematics

Claudia A. Keelan, M.F.A.

Alternative Freshman/English

Jane F. Kelleher, Ph.D.

American Sign Language
Northeastern University

Stuart D. Kelban, M.B.A.

Alternative Freshman/English
George Kelling, Ph.D.

Criminal Justice and Security
Northeastern University

- Thomas W. Kelly, M.B.A.***
Information Systems
New England Deaconess Hospital
- James M. Kenney, M.B.A.**
Management Sciences
Polaroid Corp.
- Margaret L. Kent, M.B.A.**
Alternative Freshman/English
- Linda Kent-Davis, M.B.A.**
Career/College Transition
- Philip M. Keohane, M.A.**
Journalism
GTE Corp.
- Raht Ketusingha, M.A.**
Economics
Northeastern University
- Sylvia Keyes, C.A.G.S.***
Management
Bridgewater State College
- Ferdousi Khanam, M.A.**
Sociology/Anthropology
Northeastern University
- Ali B. Khandoker, M.A.**
Economics
Northeastern University
- Nancy Kindelan, Ph.D.**
Drama/Speech
Northeastern University
- Brian L. King, M.B.A.***
Marketing
Middlesex Community College
- Janet M. King, Ph.D.**
English
Boston University
- John M. King, M.P.A.**
Criminal Justice and Security
Bentley College
- Patricia H. King, Ed.D.**
Alternative Freshman/Business
- Sandra J. King, B.S.***
Information Systems
Shawmut Bank
- Sandra T. King, M.B.A.**
Marketing
Paradise Plum Inc.
- Gary F. Kinsella, J.D.***
Political Science
Attorney at Law
- Barbara L. Klein, B.A.**
Art
BK Associates Inc.
- Saul Klein, Ph.D.**
Marketing
- James P. Kneeland, M.B.A.**
Information Systems
DYAD Corporation
- William E. Kneeland, B.S.**
Accounting
Northeastern University
- Ernest A. Knott, M.S.**
Economics
Data General
- Claire E. Knox, C.A.G.S.***
English
Northeastern University
- John L. Kobrick, Ph.D.***
Psychology
U.S. Army Research Institute
- William Kochanczyk, C.A.G.S.**
Earth Science
Museum of Science
- Bernhard J. Kohler, M.B.A.***
Industrial Management
Self-employed
- Anja S. Kondo, M.A.**
Sociology/Anthropology
- Constantina Kondopoulos, M.A.**
Alternative Freshman/Sociology
- Susan M. Kooperstein, M.S.**
Marketing
Self-employed
- Roberta L. Kosberg, Ph.D.**
Speech Communication
Curry College
- George J. Koslosky, M.B.A.**
Purchasing
Mercury Computer Systems
- James F. Kovacevic, A.S.**
Art
- Joann Kovacich, M.A.**
Sociology/Anthropology
- Stanley J. Kozikowski, Ph.D.**
English
Bryant College
- Bennett L. Kramer, M.S.***
Information Systems
Massasoit Community College
- Eileen M. Kramer, M.A.**
Health Science
Arthur S. Little Decision
- Rheta I. Kramer, M.A.**
Mathematics
Everett High School
- Willard Krasnow, J.D.**
Human Resources Management
Raytheon Company
- Elliott A. Krause, Ph.D.**
Sociology/Anthropology
Northeastern University
- Art Krauss, M.F.A.**
Art
- Carolyn L. Kraut, M.S.**
Information Systems
Self-employed
- David H. Kravetz, J.D.***
Business Law
Law Offices of David H. Kravetz
- Steven A. Kravetz, M.B.A.**
Accounting
Apparel Retail Corp.
- Michael P. Krone, Esq., J.D.**
Business Law
Private Law Practice
- Susan R. Kuder, M.A.**
English
Ravech Aronson and Shuman
- Daniel D. Kurylo, Ph.D.**
Psychology
Massachusetts Institute of Technology
- Ellen Kushner, B.A.**
English
WGBH-FM
- Goplan Kutty, Ph.D.**
Economics
Mansfield University
- Paul LaPlante, M.A.**
Modern Language
Northeastern University
- George M. Larue, M.A.**
History
Boston University
- Janine E. Labak, M.S.W.**
Technical Communications
Self-employed
- Joan F. Labbadia, M.A.**
Career/College Transition
Northeastern University
- Walter E. Labonte, M.A.**
English
Hull Public Schools
- Bruce G. LaFlamme, M.S.W.***
Health Management
Massachusetts Department of Mental Retardation
- Eddy F. Laird, E.D.**
American Sign Language
- Wendy W. Laird, M.S.**
American Sign Language
- Valerie A. Lamb, B.S.**
Radiologic Technology
Northeastern University
- Paul K. Lambert, M.B.A.***
Transportation
Lambert Consultant Inc.

Philip J. Lamy, M.A.
Sociology/Anthropology
 Essex Institute and Northeastern University

Stephen R. Lancey, Ph.D.*
Psychology
 Boston VA Medical Center

Robert H. Landry, M.B.A.*
Accounting
 Massasoit Community College

Mark J. Landry, II, B.S.
Art
 Weymouth Vo-Tech. High School

Ronald H. Lanoue, M.A.
Economics
 Mass. State Budget Bureau

Pamela J. Laskey, M.A.
Speech Communication
 Union Office Supply and Inters.

Barry D. Latta, M.S.
Information Systems
 Division of Employment Services

Thomas A. Lawler, M.S.
Accounting
 Kesna-Marcus & Co. CPAs

Charles E. Lawton, M.Ed.
English
 Lincoln High

Alfred Lazzeri, M.F.A.*
Art
 Free Lance Artist

Renee LeWinter, M.F.A.
Art
 Northeastern University

Paul A. Leblanc, M.B.A.
Finance
 Digital Equipment Corp.

Stewart L. Lebo, M.S.*
Information Systems
 Bank of Boston

Hollington Lee, B.S.
Biology
 Lee Graphics

Patricia A. Lee, B.A.
Medical Laboratory Science
 The Childrens' Hospital

Jennifer Leeman, M.A.
Modern Language

Carlton Lehmkuhl, Ph.D.
Alternative
Freshman/Mathematics

Constance Leigh, M.A.
English

Ellyn A. Lem, M.A.
Alternative Freshman/English

Margo F. Lemieux, B.F.A.
Art

Bernard J. Lemire, B.S.
Chemistry
 Northeastern University

Philip W. Le Quesne, Sc.D.
Chemistry
 Northeastern University

Thomas R. Lerra, Ph.D.
Management
 Quinsigamond Community College

Mary F. Leslie, M.Ed.*
Alternative Freshman/Language Skills
 Northeastern University

Marvin X. Lesser, Ph.D.
English
 Northeastern University

Albert M. Levenson, M.B.A.*
Management Sciences
 Charles Stark Draper Labs

Paul H. Levenson, D.D.
Philosophy/Religion
 Northeastern-Hillel

Ronald M. Levenson, B.S.
Accounting
 Peat Marwick Mitchell & Co.

George E. Levesque, M.S.
Health Management
 Rhode Island Hospital

Lawrence J. Levine, Ed.D.
Therapeutic Recreation
 City of Boston

Philip A. Levy, B.A.
Technical Communications
 Digital Equipment Corp.

David J. Lewek, M.B.A.*
Management
 Child World, Inc.

Del E. Lewis, M.F.A.*
Drama
 Northeastern University

Stephen P. Lewontin, Ph.D.
Political Science
 Gamma-Liaison Photo News

Domenic J. Liberatore, M.B.A.
Industrial Management
 Raytheon Company

Sandra M. Lictor, M.S.
Information Systems
 Raytheon Company

Janet K. Linder, J.D.
Human Resources Management
 Self-employed

Richard Lindhe, Ph.D.
Accounting
 Northeastern University

Joanne G. Linowes, M.S.*
Speech Communication
 The Corporate Medical Group

Marc Lars Lipson, M.B.A.
Finance
 Northeastern University

Robert L. Litrownik, Ph.D.
Psychology
 Taunton State Hospital

George F. Litterst, M.A.
Music
 New England Conservatory of Music

Marcia M. Littlefield, M.A.
Speech Communication

Thomas E. Littlehale, M.Ed.*
Information Systems
 Retired

Xiaolan Lx Liu, M.A.
Sociology/Anthropology
 Northeastern University

Jeannie E. Lloyd, M.A.
Alternative Freshman/English

Joseph S. Lo Castro, Ph.D.*
Psychology
 Boston VA Medical Center

Linda V. Lockwood, M.S.W.
Sociology/Anthropology

Richard B. Lockwood, B.S.
Marketing
 Bigelow Associates

Sebastian C. Lockwood, M.A.
English

Carol A. Locus, M.A.
Modern Language
 Northeastern University

Richard C. Logan, M.B.A.
Health Record Administration
 Medical Records Associates

Edward J. Lonczak, M.B.A.*
Management
 Management Consultant

Robert F. London, M.B.A.
Finance
 Raytheon Company

Paul Lopez, M.A.
Sociology/Anthropology
 Fisher College

Miller C. Lovett, Ph.D.*
Management
 University of Massachusetts/Boston

Hope E. Luder, M.A.*
History
 Burlington High School

Christopher F. Ludwig, B.F.A.

Art

Robbins

Daniel G. Lutts, M.A.

Technical Communications

Information Resources, Inc.

Maureen C. Lynch, M.A.*

English

Self-employed

Sarah-Ann Lynch, M.A.

Political Science

EF Foundation

Daniel W. Lyons, J.D.

Business Law

Self-employed

Paul E. Lyons, B.S.*

Industrial Management

The Gillette Company

Paul E. Lyons, M.Ed.

Mathematics

Cambridge School Department

Robert L. Mabardy, M.B.A.*

Human Resources Management

Ram Contracting, Inc.

Andrew C. MacAulay, M.S.*

Chemistry

New England Medical Center

Hospital

Thomas J. MacDonough, M.A.*

History

Town of Norwood

Patricia R. MacDonald, M.A.

English

Ronald C. MacKay, M.A.

English

Northeastern University

Alan A. Mackey, A.M.*

Mathematics

Retired

Diane F. MacNeil, M.S.

Nursing

Salem State College

James E. MacNeil, Jr., M.S.

Earth Science

Concord Public Schools

Sylvia A. MacPhee, M.S.*

Sociology/Anthropology

Lasell Junior College

Katherine A. MacPherson, M.A.

Journalism

Northeastern University

Maxine MacPherson, B.A.

Information Systems

Social Security Administration

Michael J. Maggard, D.B.A.

Management

Northeastern University

Judie P. Magidson, Ed.D.*

Alternative Freshman/Language

Skills

Northeastern University

Dominic J. Magnarelli, J.D.

Mathematics

Northeastern University

John A. Maguire, B.S.*

Information Systems

Regents Computer Network

John F. Maguire, M.A.

Education

Northeastern University

Thomas Maguire, M.B.A.

Accounting

Boston Business School

David P. Mahoney, J.D.

Business Law

David P. Mahoney, J.D.

Real Estate

Norfolk Superior Court

Susan S. Maire, J.D.

Business Law

Robert E. Mairs, B.S.*

Human Resources Management

Raytheon Company

Jerry I. Maisel, M.B.A.

English

Helen C. Makris, M.Ed.*

Alternative Freshman/English

Denis Malin, M.B.A.

Information Systems

Star Market Company

Judith Mallette, B.S.

Mathematics

Robert G. Mallion, M.A.*

Earth Science

Science Application Int. Corp.

Jill Mallon, M.B.A.

Accounting

Northeastern University

Gerard Malone, J.D.

Law

District Attorney's Office

John F. Maloney, M.Ed.

Mathematics

Boston Latin School

Stella Maris Maloof, M.A.

Sociology/Anthropology

Northeastern University

Anne S. Manion, M.B.A.

Health Science

Self-employed

Jeanne Mankus, M.Ed.

Therapeutic Recreation

Agape Inn

Michael E. Manning, M.A.

Music

Northeastern University

Albert R. Manson, M.Ed.*

Information Systems

Jack J. Manuel, Ph.D.*

Philosophy/Religion

Creative Humanistics, Inc.

John A. Manzo, Jr., M.S.*

Industrial Management

New England Medical Center

Hospital

Barbara B. Marcel, Ph.D.

Psychology

Northeastern University

William P. Marchione, M.A.

History

Norwell Public Schools

Alfred G. Marcotte, M.S.E.E.*

Mathematics

Mitre Corp.

Catherine Marcotte, B.A.

Mathematics

Bishop Fenwick High School

John L. Marcy, M.A.

Art

Palm Press

David Margotta, D.B.A.

Finance

Northeastern University

Julius Mariasis, M.B.A.*

Management

Steve J. Marino, B.S.

Mathematics

Wilmington High School

Janet H. Marler, M.S.

Finance

TLP Leasing Programs Inc.

Bruce E. Marquis, M.A.

Health Science

Results Service Co., Inc.

Arnold M. Marrow, Esq., LL.B.*

Human Resources Management

Self-Employed

Barry H. Marshall, M.B.A.*

Management

Digital Equipment Corp.

Barbara E. Martin, B.A.*

Medical Laboratory Science

Northeastern University

John A. Martin, M.B.A.*

Accounting

Northeastern University

John B. Martin, B.S.

Information Systems

Raytheon Company

John J. Martin, M.B.A.*
Human Resources Management
 Federal Mediation & Counsil.
 Services

Mary A. Marusich-Smith, M.A.
Sociology/Anthropology
 Northeastern University

Donald A. Marwood Esq., J.D.
Law
 Law Offices of D.J. Piscitelli

Raymond L. Mascola, M.B.A.
Marketing
 Digital Equipment Corp.

Jerry A. Masnyj, M.S.
Health Science
 Lawrence Memorial Hospital

Frederick J. Mason, Jr., B.S.*
Accounting
 Franklin Income Tax Consultant

Russell B. Mason, M.B.A.*
Marketing
 Raytheon Company

Jane D. Matheson, Ph.D.
Criminology Research

Burton N. Matross, M.B.A.*
Information Systems
 General Electric Company

George D. Matson, M.A.*
Speech Communication
 Standard Management Corp.

Kevin E. Mautte, M.S.
Biology
 Northeastern University

Thomas P. May, B.S.*
Art
 Mark Burton Inc.

Lawrence H. Mayer, B.S.
Human Resources Management
 Raytheon Company

Katherine W. Mayo, M.B.A.
Marketing
 Marketing Advantage

Teresa A. Mayors, M.A.
Sociology/Anthropology
 Commonwealth of Massachusetts

James J. Mazza, M.P.A.*
Management
 Woburn Police Department

Margaret A. McAllister, M.A.
Nursing

Robert P. McAuliffe, M.B.A.*
Marketing
 BTU Engineering Systems Inc.

Ronald J. McBrien, M.B.A.
Marketing
 Lindsay Assoc.

Paula E. McCabe, M.A.
Sociology/Anthropology
 Northeastern University

John F. McCabe, Jr., B.S.
Medical Laboratory Science
 Brigham and Women's Hospital

Morris A. McCain, Jr., Ph.D.
Political Science

Larry D. McCargar, Ph.D.
Philosophy/Religion

Daniel J. McCarthy, D.B.A.*
Management
 Northeastern University

Francis G. McCarthy, M.A.
English
 Austin Prep. School

John D. McCarthy, M.B.A.
Accounting
 U.S. Defense Department

Rita M. McCarthy, M.B.A.
Marketing
 Self-Employed

Jeffrey C. McConnell, M.A.
Philosophy/Religion
 Massachusetts Institute of Technology

Tricia McConville, M.B.A.
Management
 Training Etcetera

Leo F. McCue, Jr., Ph.D.*
History
 Central Catholic High School

Francis G. McDermott, M.A.
Management
 Retired

James F. McDermott, M.B.A.*
Accounting
 Phelps McDermott Corp.

Joseph P. McDermott, M.Ed.
Mathematics
 Algonquin Regional High School

John F. McDevitt, M.P.A.
Criminal Justice
 Northeastern University

Joseph B. McDonough, J.D.
Business Law
 HTE Hawthorne Group

Edward F. McDonough III, D.B.A.
Human Resources Management
 Northeastern University

Janet McDonough, M.A.
Earth Science
 Simmons College

William J. McDonough, M.P.A.
Health Management
 Risk Management at Harvard

Lloyd W. McElaney, M.Ed.
Information Systems
 Dept. of Public Welfare

Owen McGarrhan, B.S.
Real Estate
 Massachusetts Water Resource Authority

Patrick J. McGeary, M.A.
Technical Communications
 Digital Equipment Corp.

Daniel R. McGrath, M.Ph.
Psychology
 Northeastern University

John B. McGrath, B.S.*
Finance
 Retired

Eugene F. McGrory, B.A.
Accounting
 Internal Revenue Service

Donna J. McGuire, H.S.D.
Art
 McGuire Advertising & Design

Thomas J. McHugh, M.B.A.*
Finance
 Self-employed

William J. McIlvane, Ph.D.
Psychology
 Shriver Center

Karen Y. McIntosh, B.F.A.
Art
 Wang Laboratories

Robert A. McKean, M.A.
Technical Communications
 Chart Communications

Robert F. McKenna, M.A.
Alternative Freshman/English

James W. McKinsey, M.P.H.
Economics
 Stonehill College

Kevin J. McLatchy, M.F.A.
Art
 Self-employed

June E. McLaughlin, M.S.
Health Management
 Youville Hospital

Mark W. McLaughlin, M.A.
English

Paul D. McLaughlin, M.S.W.
Health Management
 Central Boston Elder Services

Stephen M. McLaughlin, B.S.*
Radiologic Technology
 Self-employed

Jean McLean, M.B.A.
Hotel and Restaurant Management
 Hardwick General Store

Robert W. McLean, M.B.A.

*Hotel and Restaurant
Management*
Self-employed

Denise M. McMahon, B.S.

Music

Joseph W. McNabb, M.A.

Health Management
Laboure College

Susan L. McNamara, M.Ed.*

Information Systems
McNamara & Associates Inc.

Richard J. McNeil, Jr., M.B.A.*

Economics
Northeastern University

Geraldine D. McNelly, Ph.D.

Sociology/Anthropology
Northeastern University

Clay McShane, Ph.D.

History
Northeastern University

Joanne H. Meehl, M.S.

Management
Abington Marketing Assoc.

Michael S. Mehramann, Esq., J.D.

Business Law
Law Offices of M.S. Mehramann

Maureen I. Meister, A.M.

Art
Art Institute of Boston

Bruce A. Mellin, M.S.*

Earth Science
Town of Chelmsford

Carl H. Mellin, M.B.A.

Industrial Management
Wang Information Services Corp.

Michael A. Memmolo, M.B.A.

Human Resources Management
Merrimack Valley Placement

Lloyd B. Merrill, B.S.

Information Systems
Grossman's, Inc.

George B. Merry, A.B.*

Journalism
Christian Science Publishing

Charles A. M. Meszoely, Ph.D.*

Biology
Northeastern University

Leonard F. Meuse, Jr., M.B.A.

Technical Communications
Self-Employed

Janet L. Meyer, B.S.

Radiologic Technology
Boston Floating Hospital

Michael E. Meyer, Ph.D.

Philosophy/Religion
Northeastern University

Gerry N. Michaleas, M.A.

Psychology
Hellenic College

Bonnie Michelman, M.B.A.

Security
First Security Service Corp.

Bernard Michels, Ph.D.

Sociology/Anthropology
University of Massachusetts

Sylvia I. Mignon, M.S.W.

Sociology/Anthropology

Phillip R. Miles, M.B.A.

Accounting
Polaroid Corp.

Richard A. Milius, Ph.D.

Chemistry
Research Biochemicals Inc.

Robert A. Millen, Ph.D.

Management Sciences
Northeastern University

Adriene R. Miller, M.A.

Sociology/Anthropology
Northeastern University

Amie K. Miller, B.A.

Technical Communications
Digital Equipment Corp.

Bradley Miller, Ph.D.

Political Science
Northeastern University

Charles J. Miller, M.S.

Information Systems
Informed Solutions

Ellen E. Miller, M.S.W.

Psychology
St. Elizabeth's Hospital

Hal Miller, Ph.D.

Philosophy/Religion

Kevin D. Miller, M.F.A.

English
Mary-Margaret Miller, B.S.

Information Systems
Codman & Shurtleff, Inc.

Kellie L. Mills, A.S.

American Sign Language
Massachusetts Commission for
the Deaf

Patrick N. Mingoelli, M.B.A.

Accounting
Digital Equipment Corp.

Robert J. Minichiello, D.B.A.

Marketing
Northeastern University

Richard R. Miranda, M.B.A.*

Purchasing
Multibank Financial Corporation

Kamlesh Misra, M.A.

Alternative Freshman/Economics

Muguel D. Mitchell, B.S.

Chemistry
Northeastern University

Gail F. Mohanty, Ph.D.

History
Framingham State College

Charles E. Mokotoff, M.A.

Music

James F. Molloy, Jr., M.B.A.*

Transportation
Northeastern University

Stephen P. Molloy, M.S.*

Health Record Administration
Lowell General Hospital

Abdul Momen, Ph.D.

Management Sciences
Salem School of Business

Lawrence F. Monaghan, B.S.

Information Systems
Bank of Boston

John E. Monahan, Jr., Ph.D.

Biology
CIBA Corning Diagnostics

Joseph O. Monahan, M.A.

English
Northeastern University

Robert L. Montminy, M.S.

Information Systems
Marshfield School Department

Diane L. Moore, M.A.

Philosophy/Religion
Brandeis University

John L. Moore, M.F.A.

Art
John Moore Graphic Design

Patricia A. Moore, M.A.

Health Science
Laboure Junior College

Patricia B. Moran, M.Ed.

Mathematics
Saugus High School

Leslie B. Morash, M.B.A.*

Transportation
Glenn S. Mores, M.B.A.

Information Systems
Gordon College

William R. Morin, B.S.

Information Systems
MBTA

Joanne Morreale, Ph.D.

Speech Communication
Northeastern University

Jerry A. Morris, M.B.A.*

Human Resources Management
Asquith & Jackson Assoc.

Richard M. Morrison, M.B.A.*

Information Systems

Strategic Planning Institute

William E. Morrison, B.S.*

Human Resources Management

Mary Morrissey, M.A.

Alternative Freshman/English

Peter J. Morrissey, B.S.*

Information Systems

MBTA

Mark B. Moss, Ph.D.*

Psychology

University Hospital

Magdi Moussa, B.S.

Chemistry

Edmond J. Moussally, M.Ed.

Music

Northeastern University

Tyrone C. Mowatt, M.B.A.

Applied Expert Systems Inc.

Carl F. Moxey, Ph.D.

Biology

Northeastern University

James D. Mukjian, M.B.A.*

Industrial Management

JDM Consultants

Barbara Mulcahy, M.A.

Alternative Freshman/English

John Mulhall, M.A.

Alternative Freshman/Language

Skills

Edward J. Mulholland, Ph.D.

Economics

Regis College

Edmund J. Mullen, M.Ed.*

History

Northeastern University

William S. Mullen, M.A.*

Political Science

Foxboro School System

Kevin P. Mulvey, M.A.

Sociology/Anthropology

Northeastern University

Charles W. Murphy, M.B.A.*

Finance

Bunker Hill Community College

Daniel C. Murphy, M.S.

Journalism

New England Newspaper Assoc.

David M. Murphy, Ph.D.

Speech Communication

Paul J. Murphy, J.D.*

Management

General Electric Company

Richard T. Murphy, M.Ed.

Mathematics

Boston Public Schools

Charles J. Murray, Ph.D.

Technical Communications

Digital Equipment Corp.

Keith B. Murray, D.B.A.

Marketing

Northeastern University

Vyasaraj V. Murthy, M.B.A.

Management Sciences

Digital Equipment Corp.

John A. Mylotte, B.A.

Technical Communications

Navy Cloth & Textile Research

Facility

Gerry Nadeau, M.S.

Information Systems

GTE Government Systems

Julie M. Nardone, M.A.

Sociology/Anthropology

Massachusetts Department of

Corrections

Shashi Nath, Ph.D.*

Sociology/Anthropology

Mohammed A. Nawawi, Ph.D.

Political Science

Clark University

Barbara E. Neale, M.Ed.

Speech Communication

Independent Concept Consultants

Jack M. Nedelman, M.B.A.

Alternative

Freshman/Mathematics

Theodore H. Needle, B.S.*

Accounting

Needle & Needle

David C. Nelson, B.S.*

Accounting

Self-Employed

David R. Netherton, M.S.

Political Science

Floyd G. Newton, M.A.

Art

Revolver, Inc.

Thomas J. Neylon, Jr., M.A.*

English

Watertown Public Schools

Phuoc V. Nguyen, M.S.

Chemistry

Northeastern University

Janet M. Nichols, M.B.A.

Management

Small Business Consultant

Maris Nichols, M.A.

English

Bruce E. Nickerson, Ph.D.*

English

Avco/Textron

Mary E. Nicolini, M.A.

English

James A. Nocito, M.Ed.

Modern Language

Lexington Public Schools

James C. Nolan, M.S.W.

Human Resources Management

MBTA

Maurice J. Nolan, J.D.*

Human Resources Management

Raytheon

Gerald P. Noone, J.D.

Real Estate

Law Offices of Robert Noonan

Seyed H. Noorian, M.B.A.

Finance

Boston University

John H. Northrup, M.S.

Accounting

Northeastern University

Maureen A. Norton, M.S.W.

Sociology/Anthropology

Northeastern University

Richard W. Norton, B.A.*

Information Systems

Norton Business Systems

Vincent G. Norton, M.B.A.

Human Resources Management

Raytheon Company

Karen K. Norwood, M.F.A.

Art

Northeastern University

Donald J. C. Novak, Ph.D.

Philosophy/Religion

Massachusetts General Hospital

Edward G. Novello, M.B.A.*

Transportation

Best T&D Associates

Bonnie H. Nover, M.A.

American Sign Language

R.E.A.D.S., Inc.

Michael M. Naye, M.B.A.

Accounting

Varian Assoc.

Norbert F. Nunes, M.A.*

English

Massachusetts Bay Community

College

Azinna Nwafor, Ph.D.

Political Science

David H. O'Brien, M.B.A.*

Accounting

Bank Of New England

John E. O'Brien, M.B.A.

Human Resources Management

Massachusetts Hospital

Association

Richard J. O'Brien, B.S.
Information Systems
Massachusetts General Hospital

Robert M. O'Brien, B.S.*
Information Systems
Northeastern University

Frederick T. O'Connell, J.D.*
Accounting
Internal Revenue Service

Daniel F. O'Connor, M.S.*
Information Systems
Pansophic Software

Edward J. O'Connor, B.A.
Information Systems
GTE Systems

Marta Rosso O'Laughlin, M.A.
Modern Language

Aileen J. Ofer, M.A.*
English

Moshe Ofer, M.A.
Political Science

Richard S. Offenberg, Ph.D.
Management

George C. O'Grady, B.A.
Information Systems
Digital Equipment Corp.

William J. Oldmixon, M.B.A.
Finance

A.G. Edwards & Sons Inc.

Russell W. Olive, D.B.A.
Industrial Management
Northeastern University

Ernest Oliveira, Jr., M.B.A.*
Industrial Management
General Electric Company

Dorothy M. Oliver, B.A.
Sociology/Anthropology

Thomas W. Oliver, Ph.D.
Accounting
Northeastern University

Wayne J. Oliver, M.A.*
Economics

Reed Consulting Group

George C. Olson, M.B.A.*
Information Systems
First Colonial Bank

Kim A. Olson, M.B.H.
Health Science
Leonard Morse Hospital

Kirtland H. Olson, M.A.
Technical Communications
The Harvard Group

Ronald K. Olson, B.A.
Information Systems
RKO Systems

Susan J. Olson, B.S.
Medical Laboratory Science
Northeastern University

Tommasina A. Olson, M.B.A.
Management
Fletcher Detwiler and Co., Inc.

Jeffrey Olund, M.S.
Alternative Freshman/English

David F. O'Malley, B.S.
Technical Communications

David S. Omar, M.B.A.*
Economics

Dean Junior College
Donald A. O'Neil, Ph.D.
Marketing

RCA

Leo F. O'Neill, B.S.
Medical Laboratory Science
New England Deaconess Hospital

Laurence M. Onie, M.S.W.
Speech Communication
Onie Assoc.

Andrew D. Oram, B.A.
Technical Communications
Concurrent Computer Corp.

Nancy P. Orton, B.A.*
English

Gary S. Osmond, M.B.A.
Finance

Town of Wayland

Kathleen M. O'Toole, M.S.
Policing

M.D.C. Police Department

Robert E. O'Toole, M.S.W.
Health Management

Oakdale Counseling & Training

Susan M. Ott, Ph.D.
Psychology

Fernald State School

John B. Owen, M.A.T.
Technical Communications

Owen & Co.

Daniel J. Pagnano, Esq., J.D.
Human Resources Management

Holtz & Gilman

Niranjan N. Pai, M.S.
Chemistry

Dana Farber Cancer Institute

Robert Palladino, M.B.A.
Finance

Dennison Manufacturing

Judith A. Palumbo, M.B.A.
Human Resources Management

Massachusetts Hospital Association

Anil M. Pandya, D.B.A.
Marketing

Northeastern University

Kwamina Panford, M.A.
Sociology/Anthropology

Northeastern University

Jerrie L. Paniri, M.Ed.
Art

Xyvision Inc.

Chandra S. Panse, Ph.D.
Chemistry

Boston University School of Medicine

Ujwala C. Panse, Ph.D.
Chemistry

Louis J. Pantoosco, Jr., M.B.A.
Economics

Robert J. Pappalardo, B.A.
Art

Cynthia E. Paquette, M.Ed.
Human Resources Management

Tecogen Inc.

George J. Parangimalil, M.A.
Sociology/Anthropology

Judith M. Pariseau, B.S.
Biology

Northeastern University

Cynthia J. Parker, B.S.
Management

Bank of Boston

Jeffrey S. Parker, M.A.
Technical Communications

Robert G. Parker, M.B.A.
Marketing

Self-employed

Robert H. Parris, M.A.
Corrections

U.S. Probation System

Ann C. Parsons, B.S.
Alternative

Freshman/Mathematics

Robert A. Parsons, M.B.A.
Management Sciences

Northeastern University

Virginia C. Parsons, M.A.
English

Northeastern University

S. Jack Pashoogian, B.S.
Mathematics

Retired

Paul S. Paslaski, M.B.A.*
Information Systems

Digital Equipment Corp.

Anthony F. Pastelis III, B.A.
Journalism

CO Reports Publishing

Herbert S. Patchell, M.A.

Philosophy/Religion

Helen L. Patman, M.F.A.

Speech Communication

Emerson College

Theodore C. Patrikas, B.S.*

Management

Retired

Ruth Ann Patterson, M.S.

Health Science

Milford Whitinsville Hospital

David F. Pauling, M.A.*

Modern Language

Benham Pavaresh, HS.D.

Radiologic Technology

Brigham and Women's Hospital

Susan W. Pease, M.B.A.

Technical Communications

Atena Life & Casualty

Robert J. Pecoraro, M.B.A.

Marketing

Semicon Company Inc.

Kim A. Pederson, M.F.A.

English

Charles River Assoc.

Henry L. Pelletier, M.F.A.

Art

GTE Systems Corp.

Martin L. Pendleton, Jr., B.S.*

Information Systems

Agency Management Systems

Bradley A. Pennington, M.A.

Music

Boston Conservatory

Sallyann Penta, M.B.A.

Accounting

MFS Service Center Inc.

Peter E. Perroncello, M.S.

Corrections

Assistant Deputy Super.

Eleanor M. Perrone, M.A.

Music

Self-Employed

Eileen Perry, M.B.A.

Health Management

Laboure College

Daniel Pershonok, Ph.D.*

Psychology

Harvard Medical School

Marjorie R. Peskin, M.Ed.

Technical Communications

Writing Services

Stuart S. Peterfreund, Ph.D.

English

Northeastern University

Eric D. Peterson, B.F.A.

Art

Daniel P. Petinge, M.B.A.

Purchasing

Polaroid Corp.

Ausrele M. Petronis, M.Ed.*

English

Peter T. Philliou, Ph.D.*

Mathematics

Wentworth Institute

Ralph L. Piedmont, Ph.D.

Psychology

Benjamin E. Pike, M.B.A.*

Human Resources Management

Massasoit Community College

Joseph G. Pike, M.A.

Health Record Administration

Westboro State Hospital

Karen F. Pike, M.Ed.*

Art

Deborah M. Pine, M.B.A.

Marketing

Digital Equipment Corp.

Gerald T. Pineault, M.B.A.*

Industrial Management

Polaroid Corp.

Hector E. Pineiro, B.S.

Real Estate

Department of the Attorney

General

Garth I. Pitman, Ph.D.*

English

Triton Regional High School

Lauren J. Pivnick, M.A.

Sociology/Anthropology

Northeastern University

Kevin M. Plunkett, Ph.D.

Alternative Freshman/English

Elizabeth Poel, B.A.

Hotel and Restaurant

Management

Sheraton Boston Hotel

Karen L. Pokross, M.Ed.

Therapeutic Recreation

Veterans' Administration

Joseph Polak, Ph.D.

Philosophy/Religion

Boston University

Gladys M. Polansky, M.A.*

English

Terry L. Poling, M.A.

Speech Communication

Fidelity Investments

Michael J. Pomarole, J.D.

Criminal Justice

Suffolk County

Richard Pomeroy, A.B.

Information Systems

Self-employed

David R. Portesi, B.A.

Hotel and Restaurant

Management

Massasoit Community College

John D. Post, Ph.D.*

History

Northeastern University

Michael D. Potter, A.B.

Biology

Northeastern University

Joseph L. Potts, M.B.A.*

Finance

Capital Business Group

James E. Poulos, M.A.*

English

WGBH Radio

Stephen J. Powell, M.B.A.

Finance

Simplex Time Recorder Co.

Elizabeth J. Powers, B.S.

Information Systems

Lotus Development Corp.

Kevin J. Powers, B.S.

Radiologic Technology

Northeastern University

Stephen J. Powers, M.S.*

Information Systems

Capeshore Data

Mark Prendergast, M.B.A.

Accounting

BBN Communications

Andre P. Priem, M.A.

Human Resources Management

Northeastern University

Marco M. Protano, B.S.

Management

Bank of Boston

Edward V. Puopolo, J.D.*

Business Law

Puopolo & Carr, Attorneys

John L. Putnam, C.A.G.S.

Chemistry

Marshfield Public Schools

Daniel F. Quinn, Ph.D.

Psychology

Northeastern University

Frank B. Quirk, M.A.

Information Systems

Self-Employed

Samuel Rabino, M.B.A.

Marketing

Northeastern University

Alan S. Radding, M.S.

Journalism

Advertising Age Magazine

Safoura Rafeizadeh, M.F.A.

Art

Porras & Lawlor Associates

- Dolly S. Raja, M.A.**
Economics
Division of Employment Security
- Ravi Ramamurti, D.B.A.**
Management
- Malati Ramratnam, Ph.D.**
English
Northeastern University
- Andrew S. Rancer, Ph.D.**
Speech Communication
Emerson College
- Charles W. Randall, M.B.A.**
Finance
Defense Contract Audit Agency
- George B. Ransom, Jr., Ed.D.**
Therapeutic Recreation
Northeastern University
- T. Neil Rantoul, M.F.A.**
Art
Northeastern University
- Ronald Raphael, M.Ed.**
Psychology
Raphael Associates
- Carla A. Ratti, Ph.D.**
Psychology
Northeastern University
- Juan G. Ravasi, M.A.**
Modern Language
- Lucila R. Ravasi, M.A.**
Modern Language
- Nathaniel C. Raymond, Ph.D.***
Sociology/Anthropology
University of
Massachusetts/Boston
- Catherine Y. Read, M.S.**
Nursing
Middlesex Community College
- David C. Read, B.S.**
Medical Laboratory Science
Nashua Memorial Hospital
- Bernard R. Redgate, M.S.**
Information Systems
Framingham Public Schools
- Thomas A. Reed, Ph.D.**
English
Tufts University
- Eric T. Reenstierna, B.A.**
Real Estate
T. H. Reenstierna & Sons
- Roland J. Regan, Jr., Esq., J.D.**
Marketing
- Dave J. Reich, M.F.A.**
English
Harbridge House Inc.
- Barbara J. Reid, M.Ed.**
Human Resources Management
Automatic Data Processing
- Richard M. Reilly, M.A.**
Human Resources Management
American Arbitration Assoc.
- Helen K. Reiskin, Ph.D.**
Nursing
Self-employed
- Neil Rennie, M.F.A.**
Art
Self-employed
- Sandra H. Resnick, M.Ed.**
American Sign Language
Northeastern University
- Diana E. Reynolds, Ph.D.**
Political Science
- Susan E. Reynolds, M.Ed.**
Alternative Freshman/Language Skills
- Evan B. Rich, M.B.A.***
Finance
Stone & Webster Eng. Corp.
- Judith M. Richman, M.S.**
Health Science
Self-employed
- Herbert L. Richmond, C.A.G.S.**
Health Management
Southeast Human Resources Assoc.
- Stephen L. Ridge, M.B.A.**
Accounting
Digital
- J. Scott Riley, B.S.***
Marketing
JSR Associates, Inc.
- Mordechai Rimor, Ph.D.**
Psychology
Harvard University
- Patricia N. Rissmiller, Ph.D.**
Nursing
Shriver Center
- Syed S. Rizavi, M.A.**
Economics
Northeastern University
- Daniel J. Roberts, M.Ed.**
Accounting
Northeastern University
- James F. Roberts, M.S.**
Corrections
Massachusetts Department of Corrections
- Holbrook C. Robinson, Ph.D.**
Modern Language
Northeastern University
- Holly Robinson, M.F.A.**
English
University of Massachusetts Medical Center
- Raymond H. Robinson, Ph.D.**
History
Northeastern University
- Angela Roddy, B.S.**
Radiologic Technology
Brigham and Women's Hospital
- Michelle D. Roderick, B.S.**
Therapeutic Recreation
White House Preschool
- Peggy J. Roesler, M.A.**
Therapeutic Recreation
Northeastern University
- Cephas B. Rogers, M.B.A.***
Management Sciences
Digital Equipment Corp.
- William H. Rogers, M.Ed.***
Transportation
Wise Ideas Inc.
- Irene L. Roman, Ph.D.***
Accounting
Newton North High School
- William C. Ronco, Ph.D.**
Human Resources Management
Northeastern University
- Eugene H. Rooney, Jr., M.B.A.**
Management
Massachusetts Department of Personnel Administration
- Erleen R. Rose, M.S.**
Radiologic Technology
St. Luke's Hospital
- Steven M. Rose, M.B.A.**
Accounting
Steven M. Rose, C.P.A.
- Fred A. Rosenberg, Ph.D.**
Biology
Northeastern University
- Nellie Rosenberg, M.A.**
Modern Language
Alliqui Freniaise
- Joel M. Rosenfeld, M.S.***
Industrial Management
Strategic Planning Institute
- Norma P. Rosin, M.Ed.**
Alternative Freshman/Language Skills
- Arthur S. Rousmaniere, B.A.**
Mathematics
Design Continuum, Inc.
- Richard N. Roy, M.B.A.***
Transportation
Stone & Webster Engineering Corp.
- Barry Rubenstein, M.B.A.**
Human Resources Management

Gerald R. Rubin, B.S.*

Accounting

Greene, Rubin, Miller, Pacino

Thalia Rubio, M.Ed.

Technical Communications

Language Processors Inc.

Leonard D. Rucker, M.B.A.

Technical Communications

Reading Municipal Light Dept.

A. Michael Ruderman, B.A.

Real Estate

Closings Ltd.

Louis Rudzinsky, B.S.*

Human Resources Management

Louis Rudzinsky Assoc., Inc.

Robert G. Ruland, M.B.A.

Accounting

Northeastern University

Nancy G. Rullo, M.B.A.

Finance

Commonwealth Federal Savings
Bank

Frederick L. Runyon, B.F.A.

Art

Bharat Ruparel, Ph.D.

Management

Northeastern University

Kathleen M. Russell, M.A.

Modern Language

Malden School Department

Charles M. Ryder, M.B.A.

Management

New England Mutual Life
Insurance Co.

John D. Ryder, M.B.A.*

Accounting

House Calls Inc.

Frederick J. Rys, M.B.A.*

Finance

NYNEX Service Company

Alexander R. Rysman, Ph.D.*

Sociology/Anthropology

Romm and Company

Majijeh Sabi, Ph.D.

Economics

Northeastern University

Harry Sabin Jr., M.B.A.

Purchasing

Northrop Corporation

Thaddeus P. Sadowski, M.Ed.*

Mathematics

Retired

Debra J. Saez, Ph.D.

Chemistry

Technically

Loulseged Sahlu, M.A.

Economics

Cambridge Trust

Charles L. Sakey, M.A.*

English

Retired

John A. Saltmarsh, Ph.D.

Economics

Northeastern University

Mary E. Salus, M.A.*

Sociology/Anthropology

Massachusetts Department of
Public Welfare

James B. Sampson, Ph.D.*

Psychology

U.S. Army Natick RD&E Center

Paul E. Sanders, M.B.A.

Finance

Self-employed

Jayant N. Sane, Ph.D.

Chemistry

The Gillette Company

Jean M. Sannicandro, B.A.

Mathematics

Computervision Corporation

Richard H. Saracusa, M.B.A.

Information Systems

Polaroid Corp.

Ahmad Saranjampour, M.A.

Economics

Northeastern University

Ravi Sarathy, M.B.A.

Management

Northeastern University

Willis L. Saulnier, M.S.W.*

Human Resources Management

Edward Saunders, D.B.A.

Finance

Northeastern University

George Scharfenberg, B.S.

Hotel and Restaurant

Management

Sheraton Hotel Boston

Eunice Schatz, M.A.

Women's Career Program

Live/Work Direction

John Schatzel, Ph.D.

Management

Jessie R. Schell, M.F.A.

English

John J. Schickling, M.B.A.*

Accounting

Camdex Corporation

Patricia M. Schilling, M.B.A.

Management

James A. Schirillo, M.A.

Psychology

Northeastern University

Gregory A. Schissel, S.J., M.A.

Philosophy/Religion

Society of Jesus

William J. Schmid, B.S.*

Marketing

Mark B. Schmidt, J.D.

Real Estate

Commonwealth of Massachusetts

Karen Schneiderman, M.B.A.

Alternative Freshman/English

Roy M. Schoenfeld, Esq., J.D.*

Human Resources Management

National Labor Relations Board

Beth Schoenholtz, B.S.

Alternative Freshman/English

Rodney Schonland, M.B.A.

Transportation

Polaroid Corp.

Richard Schreuer, M.A.

Sociology/Anthropology

Northeastern University

Frank A. Schubert, J.D.*

Criminal Justice

Northeastern University

Susan A. Schwalb, B.F.A.

Art

Alan R. Schwalm, B.S.

Finance

Multibank Financial Corp.

Marilyn Scrizzi, Ed.D.

English

Quinsigamond Comm. Clg.

Jeanne M. Segal, M.A.

Music

Northeastern University

Robert Seger, B.A.

Health Record Administration

St. Elizabeth's Hospital

Carol J. Seidman, A.S.

American Sign Language

Massachusetts Commission for
the Deaf and Hard of Hearing

Peter M. Selig, M.A.*

Economics

Raytheon Company

J. Thomas Selldorff, M.S.

Marketing

Memtak Corporation

Patricia C. Selleck, B.S.

Radiologic Technology

St. Anne's Hospital

Ellen Settzer, M.B.A.

Finance

Digital Equipment Corp.

Peter Serenyi, Ph.D.*

Art

Northeastern University

Rose A. Sergi, M.A.*
English
 Middlesex Community College

Susan M. Setta, Ph.D.*
Philosophy/Religion
 Northeastern University

Kathleen M. Seigny, M.B.A.*
Accounting
 Bridgewater State College

Lucy Sewall, B.A.
Human Resources Management
 Boston Capitol

John C. Shannon, M.A.*
Economics
 Suffolk University

Arthur Shaw, E.Ed.
Alternative
Freshman/Mathematics

Corey C. Shaw, J.D.
Law
 Unitas & Shaw Law Office

David M. Shaw, LL.M.
Real Estate
 Law Office of David M. Shaw

Elaine M. Shea, M.S.W.
Sociology/Anthropology
 Family Services of Greater Boston

John T. Shea, B.S.
Art
 Southeastern Regional High School

Douglas R. Shearer, Ph.D.
Radiologic Technology
 Rhode Island Hospital

Ruth C. Sheehan, M.A.
Speech Communication

Shan-Shan Sheng, M.F.A.
Art
 Self-employed

Edward H. Shenton, M.S.
Earth Science
 Homeworks

Daniel A. Shepard, B.S.
Technical Communications

Federick N. Sheppard, M.B.A.
Finance
 Bridgewater College

Joseph R. Shepeck, M.B.A.
Mathematics
 John Hancock Life Insurance Co.

Cordelia Sherman, Ph.D.
English
 Boston University

Elliot H. Sherman, M.B.A.
Finance
 Facemate Corp.

Stephen M. Shinnick, M.P.A.*
Political Science

Rebecca D. Shipp, M.F.A.
Alternative Freshman/English

Henrietta N. Shirk, Ph.D.
Technical Communications
 Northeastern University

Henrietta M. Shmase, B.A.
Health Record Administration
 Northeastern University

Ruth E. Shore, M.A.*
English
 Fisher Junior College

Paul M. Short, M.S.
Hotel & Restaurant Management
 U.S. Army Natick RD&E Center

Lee C. Shortridge, M.F.A.
Art
 Boston Guild of Artists

Stephanie Shute-Kelsch, M.A.
English
 Westwood High School

Susan F. Sieloff, M.B.A.
Marketing

Andrew Silverman, M.S.*
Accounting
 Andrew Silverman, C.P.A.

George H. Simmons, Jr., M.A.
Economics
 Pistrigas Corp.

Michael L. Simmons, M.P.A.
Political Science

Monique M. Simon, B.A.
Modern Language

S. Murray Simons, M.B.A.*
Accounting
 Stuart Management Systems

Sandra J. Simpson, M.S.
Speech Communication
 Simpson Associates

Caroline M. Sirois-Zuch, M.A.
Alternative Freshman/English

David H. Skill, M.A.
Technical Communications
 WATD Radio

Walter E. Skowronski, M.B.A.
Finance
 Boston Edison Company

Stephen E. Slaner, M.Phil.
Political Science

Lauren J. Slater, M.A.
English

Marjorie T. Slater, B.S.
Journalism
 Self-employed

Stephanie L. Small-Prasher, M.A.*
Alternative Freshman/Sociology

Donald O. Smith, Esq., J.D.*
Business Law
 Attorney at Law

Eileen Smith, B.S.
Alternative Freshman/Language Skills

George A. Smith, B.S.
Transportation
 Treasury Department, U.S. Government

Malcolm V. Smith, B.S.*
Mathematics
 New England Mutual Life Insurance Co.

Marie E. Smith, M.B.A.
Women's Career Programs
 Self-employed

Peter H. Smith, M.B.A.
Accounting
 Honeywell

Robert S. Smith, Ph.D.
Alternative Freshman/Sociology

Robert W. Smith, B.S.*
Human Resources Management
 Northrop Corp.

Paul E. Snoonian, Sr., Ph.D.*
Economics
 University of Lowell

Lolly O. Snyder, M.A.
English
 Northeastern University

Nancy P. Snyder, M.S.
Psychology
 Northeastern University

Edward J. Socha, M.B.A.
Management
 Assabet Valley Regional Vocational High School

Harold P. Sock, Ed.D.
Women's Career Program
 Gateway Counseling Services

Susan S. Sock, M.Ed.
Women's Career Program
 Assabet Center/Continuing Education

Kenneth C. Solano, M.Ed.*
Human Resources Management
 Northeastern University

Eric L. Solomon, M.A.
Technical Communications
 Electronic Pre-Press Systems

Marius M. Solomon, Ph.D.
Management Science
 Northeastern University

Rajiv S. Soman, M.S.
Chemistry
 Northeastern University

John M. Sophis, A.S.
Radiologic Technology
 Quincy City Hospital

George J. Soukaros, Ed.D.
English
 Marlboro High School

Alvaro M. Sousa, B.S.
Management
 New England Mutual Life Ins. Co.

Edward L. Sousa, M.Ed.*
Information Systems
 Northeastern University

Judith M. Sparrow, M.S.
Management
 IPL Systems Inc.

Elliot Spector, Ph.D.
Health Science
 Northeastern University

Robert M. Spector, Ph.D.*
History
 Worcester State College

John Sperou B.S.
Real Estate
 Casey & Dennis

John Spiegel, Ph.D.
Modern Language
 Northeastern University

Timothy J. Spillane, Esq., J.D.
Law
 Norfolk County

Ruth N. Spillberg, M.A.
Speech Communication

Harlan Spotts, Ph.D.
Marketing

William B. Sprout III, M.A.
English
 Harvard University

Debbie D. Stabler, M.A.
Art
 Self-employed

George H. Stacey, Jr., M.B.A.*
Information Systems
 Stacey Associates, Inc.

Richard M. Staley, M.S.
Earth Science
 Newton Public Schools

Joseph V. Stanford, M.B.A.*
Finance
 Self-employed

Meredith A. Stanford-Polloc, Ph.D.
Psychology
 Bentley College

Roberta A. Stannard, B.F.A.
Art
 Design Interaction

Rebecca G. Starr, M.S.W.
Sociology/Anthropology
 S. Area Jewish Community Center

Stanley R. Stembridge, Ph.D.
History
 Northeastern University

Lisa M. Steriti, M.A.
Sociology/Anthropology
 Northeastern University

Geoffrey R. Stern, M.A.
Technical Communications
 Northeastern University

Marilyn B. Sternbach, M.B.A.
Marketing
 Sternbach Associates

Thomas J. Stockett, B.S.*
Human Resources Management

Edmund L. Stoddard, M.S.*
English
 Raytheon Company

Joseph F. Stoltz, Ph.D.*
Economics
 U.S. Department of Labor

John R. Stomberg, M.A.
Art
 Currier Gallery of Art

John W. Stout, M.A.*
Political Science
 Roger Williams College

Walter D. Stringer, B.S.
Purchasing
 Unifirst Corp.

Nancy M. Stryker, M.B.A.
Modern Language
 Plymouth School Department

Mary F. Stubbs, M.A.
English
 University of Massachusetts/
 Harbor Campus

Robert Sugar, M.H.A.
Health Management
 Harborview Nursing Home

Edward Sulesky, J.D.*
Business Law
 District Court of Concord

Anne M. Sullivan, E.D.
Criminology Research
 Commonwealth of Massachusetts

James G. Sullivan, M.B.A.
Finance
 Digital Equipment Corp.

Jeremiah G. Sullivan, B.S.*
Information Systems
 Digital Equipment Corp.

Jeremiah J. Sullivan, Jr., J.D.
Human Resources Management
 Raytheon

John R. Sullivan, M.A.
English
 Concentric Data Systems Inc.

Pamela E. Sullivan, B.A.
Art
 Pam Sullivan Creative Studio

Paul J. Sullivan, J.D.
Criminal Justice
 Defense Logistics Agency

Stephen G. Sullivan, B.S.
History
 Mintz and Hoke

William G. Sullivan, B.A.
Journalism
 The Patriot Ledger

Zhao Sun, M.A.
Sociology/Anthropology
 Northeastern University

Herbert L. Sussman, Ph.D.
English
 Northeastern University

Daniel F. Sutton, J.D.
Human Resources Management
 Federal Labor Relations Authority

Kathleen Swanson, M.A.
Technical Communications
 Codex Corporation

William R. Swartz, M.B.A.
Industrial Management
 Axis Computer Systems, Inc.

Albert J. Sweeney, M.P.A.
Policing
 Boston Police Department

James S. Sweeney, J.D.
Criminal Justice
 Suffolk District Court

Richard D. Sweeney, B.A.
Marketing
 Mini Warehousing, Inc.

Allen M. Swenson, M.B.A.*
Economics
 Raytheon Company

Richard G. Swensson, Ph.D.
Psychology
 Harvard Medical School

Lawrence E. Symington, Ph.D.*
Psychology
 U.S. Army R&D Labs

Thomas J. Tagliamonte, M.B.A.*
Management
 New England Mutual Life Insurance Co.

Scott B. Taitel, M.B.A.

Finance

Intermetrics, Inc.

Makoto Takenaka, M.A.

Modern Language

Judy L. Talkiewicz, B.A.

Art

Itek Graphix

Debra J. Tanen, B.F.A.

Art

Communication Graphics

Sumner B. Tapper, M.Ed.*

English

Stoughton High School

Stephen P. Tarpy, M.D.

Health Science

Boston V.A. Medical Center

Theodore A. Tasis, M.A.*

English

Raytheon Service Company

Alan M. Tattle, M.Ed.*

Information Systems

Lynn School Department

Marie Tavormina, A.S.

American Sign Language

Massachusetts Commission for
the Deaf and Hard of Hearing

Gloria J. Taylor, M.A.*

Sociology/Anthropology

Commonwealth of Massachusetts

Roger B. Taylor, Esq., M.A.

Economics

Paul H. Tedesco, Ph.D.*

History

Northeastern University

Maurice Temple, M.S.*

Mathematics

Retired

Phillip A. Terrell, M.A.

Music

Northeastern University

James Tesoriero, Ph.D.

Criminology Research

Northeastern University

John B. Tessicini, M.B.A.*

Human Resources Management

Milford Housing Authority

Norman R. Tessier, C.A.G.S.*

Accounting

Roxbury Community College

Hartmut Teuber, M.A.

American Sign Language

Deaf Inc.

Corey R. Tevan, D.F.A.

Art

Self-employed

Elizabeth Thaler, B.S.

Accounting

Mass Financial

Angelos C. Thermos, Ph.D.

Criminology Research

Boston University

Emile F. Thibault, M.B.A.

Information Systems

U.S. Department of Defense

Ronald Thomas, Ph.D.

Management

Northeastern University

Lewis O. Thompson, M.B.A.

Marketing

EG&G Corp.

Phillip W. Thompson, M.S.

Marketing

Pims Assoc. Inc.

Wendy W. Thompson, M.L.*

History

Lexington Public Schools

James Thrasher, J.D.

Real Estate

Boyle, Sorgi, & Thrasher

Seymour Tiltles, Ph.D.

Management

Henry L. Tischler, Ph.D.*

Sociology/Anthropology

Framingham State College

Maureen F. Tisei, M.S.

Speech Communication

Snowden Int. High School

Mark W. Tobin, B.S.

Health Management

Ellis Nursing Home

Roy M. Tollefson, Ph.D.

Political Science

Richard W. Torian, M.Ed.*

Mathematics

Ashland High School

Bernard A. Torri, LL.B.*

Management

Mount Ida College

Frank M. Tortora, M.A.*

Economics

Northeastern University

Karen L. Tosca, M.A.

Mathematics

Westwood Public Schools

Rosario J. Tosiello, Ph.D.*

History

Pine Manor College

Allan Tosti, M.P.A.*

Political Science

Department of Revenue, Com-
monwealth of Massachusetts

Lawrence E. Towle, M.B.A.

Accounting

Digital Equipment Corp.

Edward G. Trachtenberg, M.B.A.*

Information Systems

Raytheon Company

Eileen Trauth, Ph.D.

Information Systems

Northeastern University

Salvatore M. Trento, Ed.D.

Earth Science

Surface Finds, Inc.

Robert T. Trimper, M.B.A.

Finance

Northeastern University

Prajapati Trivedi, Ph.D.

Economics

Harvard University

Frank Trocki, Ed.D.

Journalism

Northeastern University

Helen A. Tsiganou, Ph.D.

Sociology/Anthropology

Northeastern University

Martha T. Tucker, Ph.D.

Alternative Freshman/English

Jane B. Tuckerman, M.F.A.

Art

Janice K. Tulloss, M.A.

Political Science

Northeastern University

Paul L. Tumolo, M.B.A.

Industrial Management

Waters Assoc.

Laurie R. Tunick, M.S.

Accounting

Self-employed

David W. Tutein, M.A.*

English

Northeastern University

Theresa H. Twombly, M.A.*

Sociology/Anthropology

John K. Tyson, B.A.

Music

Marcia E. Unger, B.A.

American Sign Language

Newton North High School

Dale M. Urie, Ph.D.

History

Northeastern University

Philip A. Vaccaro, Ph.D.

Management Sciences

Salem State Business School

Donat A. Valcourt, B.S.*

Information Systems

Fallon Clinic

Jean A. Valentine, B.S.

Management

Bull Information Systems Inc.

Thomas S. Valovic, M.A.

Technical Communications

Telecommunications Magazine

Debora J. Van Der Molen, B.A.

Art

Marion M. Van Nostrand, M.L.S.

Alternative Freshman/English

Daniel R. Vardaro, B.S.

Art

Southeastern Regional School

District

Harvey Vetstein, Ed.D.*

English

Northeastern University

Bette A. Viano, M.B.A.

Human Resources Management

P B Diagnostics

Robert A. Vinson, M.A.*

Economics

Commonwealth of Massachusetts

Robert F. Vitale, M.B.A.*

Information Systems

Data General Corporation

William C. Vitello, M.B.A.

Accounting

TRW Inc.

Philip M. Vitti, M.A.*

Policing

Boston Police Department

Wendy Vittori, M.B.A.

Management

Deborah M. Vlock, M.A.

English

Northeastern University

William B. Vogeles, M.A.

History

Self-employed

Randy Vogenberg, M.E.D.

Nursing

Integrated Health Markets

Paula M. Vosburgh, Ed.D.

Health Science

Northeastern University

Dorothy G. Wagg, J.D.

Health Management

Massachusetts Hospital Association, Inc.

Diane V. Wald, M.F.A.

English

Northeastern University

Nancy L. Walden, M.S.

Nursing

Northeastern University

Burke M. Walker, M.S.

Marketing

Scudder Stevens & Clark

Nancy R. Walla, M.Ed.

American Sign Language

Learning Center for Deaf

Children

Denise V. Wallace, M.S.

Criminology Research

Sandra L. Wallace, B.A.

Art

S.I.S. Inc.

Ann L. Walsh, J.D.*

Health Management

Abelson, Cohen & Scarpaci

David A. Walsh, M.Ed.

Mathematics

Westwood High School

Martin S. Walsh, M.B.A.*

History

Huntington Consultant Group

William F. Walsh, M.Ed.

Marketing

Bill Walsh Associates

John M. Warren, M.S.M.E.

Mathematics

Raytheon Company

Lois D. Wasserman, Ph.D.*

History

Braintree Library

John M. Watrous, M.A.

Drama/Speech

Brandeis University

Robert W. Wauhkonen, M.A.

English

Art Institute of Boston

Sheila P. Waxman, D.F.A.

Music

Massachusetts Institute of

Technology

Robert C. Webb, Ph.D.*

Psychology

Suffolk University

Robert L. Webb, M.Ed.*

Human Resources Management

Boston Gas Company

Bruce K. Webster, M.B.A.

Marketing

Metro Advertising, Inc.

David Webster, J.D.

Real Estate

Jeanne D. Weikert, M.D.

Philosophy/Religion

Dr. David Weiss

Judith Wellerstein, R.R.A., M.P.H.

Health Record Administration

Northeastern University

Richard S. Wein, M.A.*

Sociology/Anthropology

Winthrop Public Schools

Susan I. Weiner, M.S.

Accounting

Bolt Beranek & Newman

Sara C. Weintraub, M.A.

Speech Communication

Boston College

Arthur J. Weitzman, Ph.D.*

English

Northeastern University

Daniel A. Welch, M.S.*

Criminal Justice

Boston University

Jonathan B. Welch, Ph.D.*

Finance

Northeastern University

Charles H. Wellens, M.B.A.

Accounting

Fitchburg State College

Jennifer J. Wells, M.A.

Therapeutic Recreation

Wells & Co. Inc.

Robert L. Wells, M.A.*

Art

Northeastern University

Patricia L. Wermers, M.S.

Mathematics

North Shore Community College

Edward Wertheim, Ph.D.

Human Resources Management

Harry Wessel, Ph.D.

Political Science

Merrimack College

Barry J. West, M.A.

Technical Communications

Techwrite Documentation Co.

Woodley K. West, M.A.

Alternative Freshman/English

Doe West-Gale, M.S.

Therapeutic Recreation

Myth-Breakers, Inc.

Robert E. Wheeler, M.B.A.

Information Systems

Butterworth Publishers

Charles W. White, Ph.D.*

English

Southeastern Massachusetts

University

Dennis M. White, M.B.A.

Accounting

BBN Manufacturing Corp.

Eric M. White, M.A.

Art

- Laura B. White, B.A.**
Journalism
- Paul F. White, M.A.**
Sociology/Anthropology
Quincy Junior College
- Sheila F. White, M.A.***
Alternative Freshman/History
Northeastern University
- Susan Whittaker, B.A.**
Speech Communication
- Joanna Whoolery, M.A.**
Alternative Freshman/Language Skills
- Martin D. Wiener, M.B.A.**
Management
Security Lock Distributors
- Marilyne J. Wild, M.A.**
English
John Hancock Mutual Life Insurance
- Patricia R. Willett, B.S.**
Radiologic Technology
Brigham & Women's Hospital
- Charlotte M. Williams, M.B.A.**
Finance
Digital Equipment Corp.
- Christina Williams, M.B.A.***
Accounting
Digital Equipment Corp.
- Kerry Williams, C.P.A.**
Accounting
Camp Dresser & McKee
- Linda P. Williams, M.B.A.**
Alternative Freshman/English
- Nancy Williamson, M.Ed.**
English
Haas & Sampson
- Alexander B. Wilson, M.A.***
History
Self-Employed
- George R. Wilson, D.B.A.**
Management
Hayman Investments
- James X. Wilson, C.A.G.S.**
Marketing
The Boston Company
- Richard L. Wilson, M.Ed.***
Alternative Freshman/English
Northeastern University
- Susan Wilson, J.D.**
Health Management
Law Offices of N.J. Fine
- Walter B. Winchenbach, M.B.A.**
Purchasing
Hewlett-Packard Corp.
- Cathy Winkler, Ph.D.**
Sociology/Anthropology
Northeastern University
- Alvin G. Wint, M.B.A.**
Finance
Northeastern University
- Gail S. Wintersteiner, Ph.D.***
Philosophy/Religion
- Fred Wiseman, Ph.D.**
Marketing
- Donald E. Witkoski, M.S.**
Hotel and Restaurant Management
Cape Cod Community College
- Joseph K. Witmer, J.D.**
Political Science
- Edward H. Witten, Ph.D.**
Chemistry
Northeastern University
- Matthew Witten, M.F.A.**
Alternative Freshman/Language Skills
- Jeffrey Wolfe, B.S.**
Real Estate
Equitable Real Estate
- Susan J. Wollins, M.S.**
Criminology Research
Comp. Offender Employment Resource
- Peter T. Woloschuk, M.A.**
Journalism
Lafayette Hotel
- Mark S. Woodhams, M.A.**
Journalism
Northeastern University
- Michael L. Woodnick, M.S.***
Speech Communication
Northeastern University
- Julie Woods, M.S.**
Alternative Freshman/English
- Pauline G. Woodward, M.A.**
English
Endicott College
- Steve Worth, Ph.D.***
Political Science
Northeastern University
- Steven H. Wright, Esq., J.D.**
Real Estate
MBTA
- Sharon A. Wuif, Ph.D.**
Management
Digital Equipment Corp.
- Laurie Wurster, M.A.**
Speech Communication
The Data Group Company
- Elizabeth J. Wyka, M.A.**
Alternative Freshman/History
Northeastern University
- Susan E. Yates, M.A.**
English
Northeastern University
- Dagne Yesihak, M.S.**
Security
Hyatt Regency
- Mustafa R. Yilmaz, Ph.D.**
Management Sciences
Northeastern University
- Robert T. Yosca, M.S.**
Management Sciences
Digital Equipment Corp.
- Harold S. Zamansky, Ph.D.***
Psychology
Northeastern University
- Paul J. Zambella, M.A.**
Policing
Department of Public Safety
- Dorothy M. Zanni, M.S.**
Information Systems
Wang Laboratories
- Walter P. Zanor, B.S.***
Mathematics
Everett High School
- Alan J. Zaremba, Ph.D.**
Speech Communication
Northeastern University
- Barry L. Zaslove, M.S.**
Mathematics
- Arnold S. Zeitlin, M.A.**
Journalism
World Paper
- Stuart J. Zerner, M.B.A.**
Purchasing
Varian Associates, Inc
- Stephen S. Ziedman, J.D.**
Real Estate
Keches & Mallen PC
- Gregory A. Zikos, J.D.**
Business Law
Pappas & Krone Law Offices
- John L. Zimka, Ph.D.***
Accounting
Boston College
- Barbara A. Zlotnick, M.B.A.**
Alternative Freshman/History
- David L. Zoffoli, M.Ed.**
Speech Communication
North Shore Music Theatre
- Gregory B. T. Zuch, M.A.**
English
Northeastern University

University College Administrative Officers

John W. Jordan, B.S., M.Ed.
Dean, University College
Nancy Bandoian
Assistant to the Director, Liberal Arts
Janet A. Carroll, M.S., R.N.
Nursing, Continuing Education
Richard J. Comings, A.B., M.A., M.P.A.
Assistant Dean, Director, Special Programs
Sandra M. Conant, R.N., M.S.
Academic Coordinator, B.S. Nursing Program
Rose A. Doherty, B.A., M.A.
Assistant Director, Business Administration Programs
Michael S. Dvorchak, B.A., M.A.
Associate Dean, Director, Burlington Suburban Campus
William T. Edgett, A.B., M.A.
Assistant Dean, Assistant Director, Academic and Student Affairs
Mark W. Erickson, B.A., M.Ed.
Assistant Director, Academic and Student Affairs
Carol L. Fulton, B.A., B.S.
Assistant Director, Academic and Student Affairs
Susanne E. Goodson, B.S.
Assistant Registrar, Graduate Schools and Part-time Programs
Lisa C. Gruccio, A.S.
Administrative Coordinator, Academic and Student Affairs
Kathleen H. Hayes, A.B., Ed.M.
Director, Adult and Special Programs, Office of Career Development and Placement
Sarah Jane Hall
Editorial Assistant, Publications
Marilyn L. Jackson, B.A.
Publicity Coordinator
David R. Kane, B.S.
Registrar, Graduate Schools and Part-time Programs
Mary M. Kiley, B.S.
Administrative Assistant, Administration
Valerie A. Lamb, B.S., R.T.
Assistant Director, Radiologic Technology Program
Lana B. Melnik, B.S., M.J.
Assistant Director, Academic and Student Affairs

Carolyn M. Montalto, B.A.
Manager, Advertising and Creative Services
Marilyn P. Patt, B.A.
Programmer-Analyst
Jacqueline Platt, B.S., M.Ed.
Assistant Director, Director of Counseling, Burlington Suburban Campus
William J. Purnell III, B.S.B.A.
Associate Registrar, Graduate Schools and Part-Time Programs
Kevin J. Powers, B.S., R.T.
Director, Radiologic Technology Program
David M. Rayne
Director, Paramedic Programs
Sharon K. Romano, R.N.
Clinical Coordinator, Paramedic Programs
Lizbeth C. Roper, B.A.
Facilities Coordinator, Liberty Square Campus
Kenneth C. Solano, A.B., M.Ed.
Associate Dean
Edward L. Sousa, B.S., M.Ed.
Director, Administrative Services
Janet M. Spellman, B.S.N.
Coordinator, Paramedic Programs
Judith Stoessel, A.B., M.A.
Assistant Dean, Director, Academic and Student Affairs
Frank Trocki, B.S., M.S., Ed.D.
Director, Graphic Arts Program
Ralph T. Vernile, Jr., B.S.
Associate Dean, Administration
Paula M. Vosburgh, B.S., M.S., Ed.D.
Assistant Dean, Director, Health Professions and Science Programs
Diane Wald, B.A., M.F.A.
Director, Liberal Arts Programs
Martha P. Welch, B.S., M.Ed., Ed.D.
Assistant Dean, Director, Business Programs
Jennifer J. Wells, B.A., M.S.
Assistant to Manager, AFY Program
Marilyn S. Wiener, A.B., M.A.
Associate Dean of Academic Programs
Richard L. Wilson, B.A., B.S., M.Div., Ed.M.
Program Manager, Alternative Freshman-Year Program
Catherine D. Zeigler, B.A.
Assistant Director, Academic and Student Affairs

Executive Committee

John W. Jordan, Chair
Kenneth C. Solano
Judith Stoessel
Ralph T. Vernile, Jr.

Paula M. Vosburgh
Diane Wald
Martha P. Welch
Marilyn S. Wiener

**Committee
on Academic
Standing**

Carol L. Fulton, Chair
Mark W. Erickson
Kevin J. Powers

Diane Wald
Martha P. Welch

**Business
Administration
Curriculum
Committee**

Martha P. Welch, Chair
Stephen F. Armstrong
Brendan Bannister
Dan T. Dunn, Jr.
W. Arthur Gagne
Victor B. Godin
Paul A. Janell

Daniel McCarthy
Robert A. Parsons
Joseph V. Stanford
Jonathan B. Welch
Two Student Representatives
John W. Jordan, *Ex Officio*

**Criminal
Justice and
Security
Programs
Committee**

Richard J. Comings, Chair
John W. Jordan, Co-Chair
Norman Rosenblatt, Co-Chair
Norman D. Bates

Edith E. Flynn
George R. Kelling
Frank A. Schubert

**Health
Professions
Curriculum
Committee**

Paula M. Vosburgh, Chair
Theodore Blank
Annalee Collins
Barbara E. Martin

Carl W. Nelson
Two Student Representatives
Two Faculty Representatives
John W. Jordan, *Ex Officio*

**Liberal Arts
Curriculum
Committee**

Diane Wald, Chair
Nancy Becker
L. Gerald Bursey
Neil F. Duane
Christine W. Gailey
Larue W. Gilleland
Harold M. Goldstein
Joshua R. Jacobson
Charles Karis

Marvin X. Lesser
Holbrook C. Robinson
Raymond H. Robinson
Peter Serenyi
Susan Setta
Frank Trocki
Two Student Representatives
Two Part-Time Faculty Representatives
John W. Jordan, *Ex Officio*

**Library
Advisory
Committee**

Richard J. Comings, Chair
Marvin X. Lesser
John W. Jordan, *Ex Officio*

**Science
Programs
Curriculum
Committee**

Paula M. Vosburgh, Chair
Francis X. Finigan
Malcolm D. Hill
Philip W. Lequesne
Carl F. Moxey

Fred A. Rosenberg
One Student Representative
One Part-Time Faculty Representative
John W. Jordan, *Ex Officio*

**Therapeutic
Recreation
Curriculum
Committee**

Paula M. Vosburgh, Chair
George B. Ransom, Jr.
Herbert Richmond

Two Student Representatives
John W. Jordan, *Ex Officio*

**Board of
Inquiry**

Ralph T. Vernile, Chair
Marilyn S. Wiener

Two Faculty Representatives
One Student Representative

**Advisor for
Judicial
Matters**

Kenneth C. Solano

University Governing Boards and Officers

Officers of the Corporation 1990-1991

George J. Matthews
Chairman
William F. Allen, Jr.
Vice Chairman
John Lowell
Vice Chairman
Vincent J. Lembo
Secretary
Deanna P. Jantzen
Assistant Secretary
Joseph D. Murphy
Assistant Secretary
Byron K. Elliott
Lifetime Chairman Emeritus
Robert H. Willis
Chairman Emeritus
Thomas E. Cargill, Jr.
Vice Chairman Emeritus
William R. Driver, Jr.
Vice Chairman Emeritus
Frank L. Farwell
Vice Chairman Emeritus
Charlotte B. Smith
Vice Chairman Emerita
D. Thomas Trigg
Vice Chairman Emeritus

Board of Trustees

Class of 1991

Vincent Barletta
Louis W. Cabot
John J. Cullinane
Phil David Fine
Arnold S. Hiatt
Kenneth A. Loftman
John Lowell
Katherine S. McHugh
Edward O. Owens

Class of 1992

Michael J. Cronin
Joseph E. Heney
George S. Kariotis
Diane H. Lupean
Peter F. O'Connell
William J. Pruyn
Bernard Solomon
H. Patricia Taylor
Alan D. Tobin
Robert H. Willis
Charles A. Zraket

Class of 1993

Ruth S. Felton
Neal F. Finnegan
Ernest Henderson III
Carl R. Hurtig
Harvey C. Krentzman
Robert C. Marini
George J. Matthews
Kenneth G. Ryder
W. Nicholas Thorndike
James L. Waters
Catherine A. White

Class of 1994

William F. Allen, Jr.
Frederick L. Brown
Helene R. Cahners-Kaplan
Gary L. Countryman
James S. Hekimian
Kathryn M. Nicholson
Richard C. Ockerbloom
Dennis J. Picard
George A. Snell
Stephen J. Sweeney
Martin F. Walsh

Ex Officio

John A. Curry

Honorary Trustees

James V. Fetchero
Kenneth G. Fisher
Thomas L. Phillips

Lifetime Trustees, Emeriti

Diana J. Auger
Roy H. Beaton
F. Gregg Bemis
Thomas E. Cargill, Jr.
William R. Driver, Jr.
Byron K. Elliott
Frank L. Farwell
Lloyd S. Glidden, Jr.
Donald B. Guy
Allan M. Hale
Robert L. Johnson
Henry C. Jones
Frances C. Kenerson
Asa S. Knowles
Lawrence H. Martin
Francis J. Quirico
Charlotte B. Smith
Donald W. Smith
D. Thomas Trigg
Chaplin Tyler
Alvin C. Zises

Board of Overseers

Class of 1991

Philip M. Chrusz
Joseph D. Feaster, Jr.
Arnold I. Friedman
Frederic T. Hersey
John J. Hurley, Jr.
C. Joseph LaBonte
Joseph C. Lawler III
Walter E. Mattson
Alan S. McKim
John A. McNeice
George Putnam

Class of 1992

Louis H. Barnett
Frederick Brodsky
Harry T. Daniels
Carl E. Dantas
Phil Johnston
John F. Smith
Peter V. Sorgi
Galen L. Stone
Carole J. Uhrich
Edward L. Wax
John T. Williams

Class of 1993

George D. Behrakis
Scott M. Black
Stuart M. Bloch
William L. Brown
Richard P. Chapman, Jr.
Robert A. Clayson
Carol L. Cone
T. Paul Connolly
William J. Cotter
James A. Daley
Melanie C. Dean

Class of 1994

Kenneth W. Ballou
Richard L. Bready
William Elfers
Albert S. Frager
Brenda J. Furlong
Judy George
Colby Hewitt, Jr.
Donald J. Kramer
Chan K. Lin
K. Prescott Low
Jasper W. Morgan, Jr.

Ex Officio

John A. Curry
George J. Matthews
President, Alumni Association
Chairman, The National Council

Members of the Corporation

*Member of the Board of Trustees

†Honorary Trustee

‡Lifetime Trustee Emeritus or Emerita

§Member of the Board of Overseers

Class of 1991

Richard A. Albertini
George R. Baldwin
*Vincent Barletta
Michael A. Brown
*Louis W. Cabot
Lawrence G. Cetrulo
§Philip M. Chrusz
George C. Chryssis
James E. Cofield, Jr.
William E. Cook
Dorothy G. Cooley
T. Jeff Coolidge, Jr.
S. James Coppersmith
*John J. Cullinane
Douglas G. DeVivo
§Arnold I. Friedman
Charles K. Gifford
§Frederic T. Hersey
*Arnold S. Hiatt
§John J. Hurley, Jr.
Ralph E. Hutchins
John F. Kerry
§C. Joseph LaBonte
§Joseph C. Lawler III
Bertram M. Lee
*Kenneth A. Loftman
*John Lowell
*Robert C. Marini
‡Lawrence H. Martin
M. Dorothy Massey
§Walter E. Mattson
William J. McCune, Jr.
*Katherine S. McHugh
§Alan S. McKim
§John A. McNeice, Jr.
Dominic Meo, Jr.
Donald H. Moore
James A. Morris
E. James Morton
Donald S. Moscone
Lawrence C. Moulter
N. Laurence Nagle
William H. Nichols, Jr.
Stanley C. Olsen
James H. Orr
*Edward O. Owens
Ara Oztemel
Sophia H. Pappas
Lawrence T. Perera
Nicholas V. Petrou
Edward E. Phillips
†Thomas L. Phillips
Edward D. Phinney
Rudolph F. Pierce

Jerome M. Powell
Albert Pratt
John F. Prendiville
§George Putnam
‡Francis J. Quirico
William H. Raye, Jr.
Kathleen M. Rice
D. Paul Rich
Robert Riesman
Daniel J. Roberts
‡Charlotte B. Smith
Seymour L. Yanoff

Class of 1992

§Louis H. Barnett
‡Thomas E. Cargill, Jr.
*Michael J. Cronin
James S. Curvey
§Harry T. Daniels
§Carl E. Dantas
Theodore S. D'Orlando
William J. Downey
Thomas A. Farrington, Jr.
Robert R. Feier
†Kenneth G. Fisher
Frieda Garcia
Corinne P. Grande
*Joseph E. Heney
Deborah C. Jackson
Edward C. Johnson III
Robert F. Johnson
‡Robert L. Johnson
§Phil Johnston
*George S. Kariotis
Paul G. Keough
James J. Kerasiotes
Andre A. Laus
*Diane H. Lupean
Terence P. McDermott
*Peter F. O'Connell
*Richard C. Ockerbloom
Paul J. Palmer
*Dennis J. Picard
*William J. Pruyn
W. Warren Ramirez
Ralph B. Rogers
Ronald L. Rossetti
Ernest J. Sargeant
Donald W. Seager
Sydney Shaftman
James L. Shanahan
Dorothy M. Simon
Paul D. Slater
§John F. Smith
‡Donald W. Smith
O. Phillip Snowden
*Bernard Solomon
§Peter V. Sorgi
Robert C. Sprague
Milton Stern

David B. Stone
§Galen L. Stone
*H. Patricia Taylor
Lawrence I. Templeman
Charles H. Tenney II
Milton A. Thompson
*W. Nicholas Thorndike
*Alan D. Tobin
Paul E. Tsongas
Joseph F. Turley
‡Chaplin Tyler
William Tyler
§Carole J. Uhrich
§Edward L. Wax
David T. Wendell
Donald F. Whiston
§John T. Williams
*Robert H. Willis
Richard W. Young
‡Alvin C. Zises

Class of 1993

Julius Abrams
Yusef A. As'ad
‡Diana J. Auger
Robert J. Awkward
Lincoln C. Bateson
‡Roy H. Beaton
§George D. Behrakis
‡F. Gregg Bemis
Alfred M. Bertocchi
§Scott M. Black
§Stuart Marshall Bloch
S. Whitney Bradley
Melvin B. Bradshaw
§Richard L. Bready
§William L. Brown
Wayne A. Budd
John L. Burns
Victor C. Bynoe
Milton L. Cail
James F. Carlin
§Richard P. Chapman, Jr.
§Robert A. Clayton
Livingstone N. Coakley
Abram T. Collier
§Carol L. Cone
§T. Paul Connolly
James J. Costello
§William J. Cotter
Edward Creiger
H. James Crossan, Jr.
§James A. Daley
J. H. Dow Davis
§Melanie C. Dean
William O. DiPietro
Alfred di Scipio
Estelle Dockser
David F. Doyle
‡William R. Driver, Jr.
*Ruth S. Felton

Mark S. Ferber
 †James V. Fetchero
 §Judy George
 Joseph A. Grady
 Calvin M. Grimes, Jr.
 *Ernest Henderson III
 Edward L. Hennessy, Jr.
 D. Brainerd Holmes
 *Carl R. Hurtig
 Walter I. Keyes
 Thomas L. King
 *Harvey C. Krentzman
 Dean T. Langford
 George A. MacConnell
 *George J. Matthews
 William M. McDonough
 Arthur A. Pappas
 R. Robert Popeo
 Mark Roosevelt
 *Kenneth G. Ryder
 Thomas F. Skelly
 Ray Stata
 Garrett A. Sullivan
 Wilson B. Tuffin
 Randel E. Vataha
 *James L. Waters
 *Catherine A. White
 *Charles A. Zraket

Class of 1994

*William F. Allen, Jr.
 Jacqueline D. Arthur
 §Kenneth W. Ballou
 Alan D. Bell
 §Frederick Brodsky
 *Frederick L. Brown
 *Helene R. Cahners-Kaplan
 Walter J. Connolly, Jr.
 *Gary L. Countryman
 William S. Edgerly
 Richard J. Egan
 §William Elfers
 †Byron K. Elliott
 †Frank L. Farwell
 §Joseph D. Feaster, Jr.
 *Phil David Fine
 *Neal F. Finnegan
 §Albert S. Frager
 §Brenda J. Furlong
 Murray J. Gart
 Paul W. Glennon
 †Lloyd S. Glidden, Jr.
 Rosalind E. Gorin
 John L. Grandin
 †Donald B. Guy
 †Allan M. Hale
 Michael E. Haynes
 *James S. Hekimian
 William Hellman
 James S. Herbert
 §Colby Hewitt, Jr.

Richard D. Hill
 Robert W. Holmes
 Hartwell G. Howe
 Richard P. Johnson
 †Henry C. Jones
 Richard Kazmaier
 Walter B. Kelley
 †Frances C. Kenerson
 Edward M. Kennedy
 Fenton G. Keyes
 Calvin A. King
 †Asa S. Knowles
 §Donald J. Kramer
 Evelyn M. Lane
 Maurice Lazarus
 John R. Leeman
 Elma Lewis
 §Chan K. Lin
 George M. Lovejoy, Jr.
 §K. Prescott Low
 Peter E. Madden
 Maurice Mann
 Sydney Miller
 §Jasper W. Morgan, Jr.
 *Kathryn M. Nicholson
 R. Yvonne Park
 Patrick A. Rivelli
 Janet M. Smith
 *George A. Snell
 Jerry M. Socol
 *Stephen J. Sweeney
 Jean C. Tempel
 John F. Tbomey
 †D. Thomas Trigg
 *Martin F. Walsh
 Lucille R. Zanghi

Ex Officio

John A. Curry
 President of the University

Administrative Organization

Officers of the University

John A. Curry, A.B., Ed.M., Ed.D.
President
 Michael A. Baer, B.A., M.A., Ph.D.
Provost and Senior Vice President for Academic Affairs
 Philip T. Crotty, A.B., A.M., M.B.A., M.Sc., Ed.D.
Senior Vice President for Administration
 Edmund L. Deltano, B.A.
Vice President for Finance and Acting Treasurer
 James B. King, B.A., LL.D (hon)
Senior Vice President for Government Relations and Community Affairs

Asa S. Knowles, A.B., A.M., LL.D., Litt.D., Sc.D., D.B.A. Sc.D.
in Bus. Ed. (hon)
Chancellor Emeritus
 Philip LaTorre, B.S., M.S.
Vice President for Human Resources Management
 John A. Martin, B.S., M.B.A.
Vice President for Business
 John D. O'Bryant, B.S., M.Ed.
Vice President for Student Affairs
 Eugene M. Reppucci, Jr., B.S., M.Ed.
Senior Vice President for Development
 Kenneth G. Ryder, A.B., M.A., L.H.D., D.Sc.Ed., Litt. D. (hon)
Chancellor
 Royal K. Toebes, B.S., M.B.A.
Vice President for Alumni Development
 Karl Weiss, B.S., Ph.D.
Vice President for Academic Development and Interim Vice President for Cooperative Education

Academic Deans, Directors of Schools, and General Administrative Officers

Alan R. Benenfeld, B.Met.E., M.L.S., M.S.
Dean and Director of University Libraries
 Mehdi Boroujerdi, Ph.D., Pharm.D.
Associate Dean and Director of the Graduate School of the College of Pharmacy and Allied Health Professions
 David P. Boyd, B.A., Ph.D.
Dean of the College of Business Administration
 Cynthia A. Brown, B.S., M.A., Ph.D.
Acting Dean of the College of Computer Science
 Irwin M. Cohen, B.S., M.S.
Director of Men's Athletics
 Martin J. Damian, B.S.
Bursar
 Charles Devlin, B.S., M.Ed.
Dean of Student Financial Services
 William M. Fowler, Jr., B.A., Ph.D.
Vice Provost for Undergraduate Education
 David R. Freeman, B.Mgt.E., M.S., Ph.D.
Associate Dean of Engineering and Director of the Graduate School of Engineering

William A. Frohlich, B.A.
Dean and Director of University Press

Daniel J. Givelber, A.B., LL.B.
Dean of the School of Law

James J. Gozzo, B.S., Ph.D.
Dean of the College of Pharmacy and Allied Health Professions

Charles L. Hallenborg, B.S., M.P.A.
Dean of Physical Planning and Operations

Daryl A. Hellman, B.S., Ph.D.
Vice Provost for Faculty Affairs and Student Relations

Thomas E. Hulbert, B.Mgt.E., M.S.
Director of School of Engineering Technology and Associate Dean of Engineering

Ellen S. Jackson, B.A., Ed.M., C.A.G.S., D.H., D.H.L. (hon.)
Dean and Director of Affirmative Action

John W. Jordan, B.S., M.Ed.
Dean of University College

Paul M. Kalaghan, A.B., M.S., Ph.D.
Vice Provost for Research and Graduate Education

William I. Kelly, B.S., M.S.
Director of the Graduate School of Professional Accounting

Paul H. King, B.S., M.S., Ph.D.
Dean of the College of Engineering

Paul M. Lepley, B.S., M.Ed., Ed.D.
Dean of the Boston-Bowvé College of Human Development Professions

Robert P. Lowndes, B.S., M.B.A., Ph.D.
Dean of the College of Arts and Sciences

Bruce W. Lowney, M.D.
Director of Health Services

Philip R. McCabe, B.A., M.Ed.
Dean of Admissions

Edmund J. Mullen, B.A., M.Ed.
University Registrar

Kay D. Onan, B.A. Ph.D.
Associate Dean for Faculty Affairs and Director of the Graduate School of the College of Arts and Sciences

Paul M. Pratt, B.S., M.Ed.
Dean of the Department of Cooperative Education

Karen T. Rigg, A.B., M.A., Ed.D.
Dean of Students

Norman Rosenblatt, A.B., Ph.D.
Dean of the College of Criminal Justice and Director of the Graduate Program in Criminal Justice

Jeanne L. Rowlands, B.A., B.S., M.A.
Director of Women's Athletics

Phyllis M. Schaen, B.S., M.Ed., Ed.D.
Dean of Administration

Carole A. Shea, R.N., B.S., M.S., Ph.D.
Interim Director of the Graduate School of the College of Nursing

Janice Walker, A.B.
Assistant Dean of Boston-Bowvé College of Human Development Professions and Director of the Graduate School

Mitchell Wand, S.B., M.S., Ph.D.
Associate Dean and Director of Graduate Studies of the College of Computer Science

Joseph Zolner, B.S., M.P.P.M.
Director of the Graduate School of the College of Business Administration

Eileen H. Zungolo, R.N., B.S., M.Ed., Ed.D.
Dean of the College of Nursing

General University Committees

Joint Advisory Council, 1990-91

John A. Curry
 Chairman

Michael A. Baer
 Vice Chairman

Alan R. Benenfeld

David P. Boyd

Cynthia A. Brown

Philip T. Crotty

Edmund L. Deltano

William M. Fowler

Daniel J. Givelber

James J. Gozzo

Daryl A. Hellman

John W. Jordan

Paul M. Kalaghan

James B. King

Paul H. King

Philip La Torre

Paul M. Lepley

Robert P. Lowndes

John A. Martin

John D. O'Bryant

Paul M. Pratt

Eugene M. Repucci, Jr.

Norman Rosenblatt

Arthur D. Smith

Royal K. Toebes

Karl Weiss

Eileen H. Zungolo

Faculty Senate, 1989-90

Neil Alper

Kostia Bergman

David P. Boyd

Ralph A. Buonopane

Holly M. Carter

Richard A. Daynard

Charles H. Ellis, Jr.

William L. Faissler

Edith E. Flynn

Christine W. Gailey

Daniel J. Givelber

Harold M. Goldstein

Alexander M. Gorlov

James J. Gozzo

Deborah F. Greenwald

Carolyn D. Heising

John W. Jordan

Paul H. King

Paul M. Lepley

Robert P. Lowndes

Wesley W. Marple, Jr.

S. James Matthews

Joseph W. Meador

Stephen W. McKnight

Robert W. Miller

Stephen L. Nathanson

Irene A. Nichols

Suzanne Ogden

Robert A. Parsons

Paul M. Pratt

Norman Rosenblatt

Eugene J. Saletan

Edward Saunders

Gustav Schachter

Philip E. Serafim

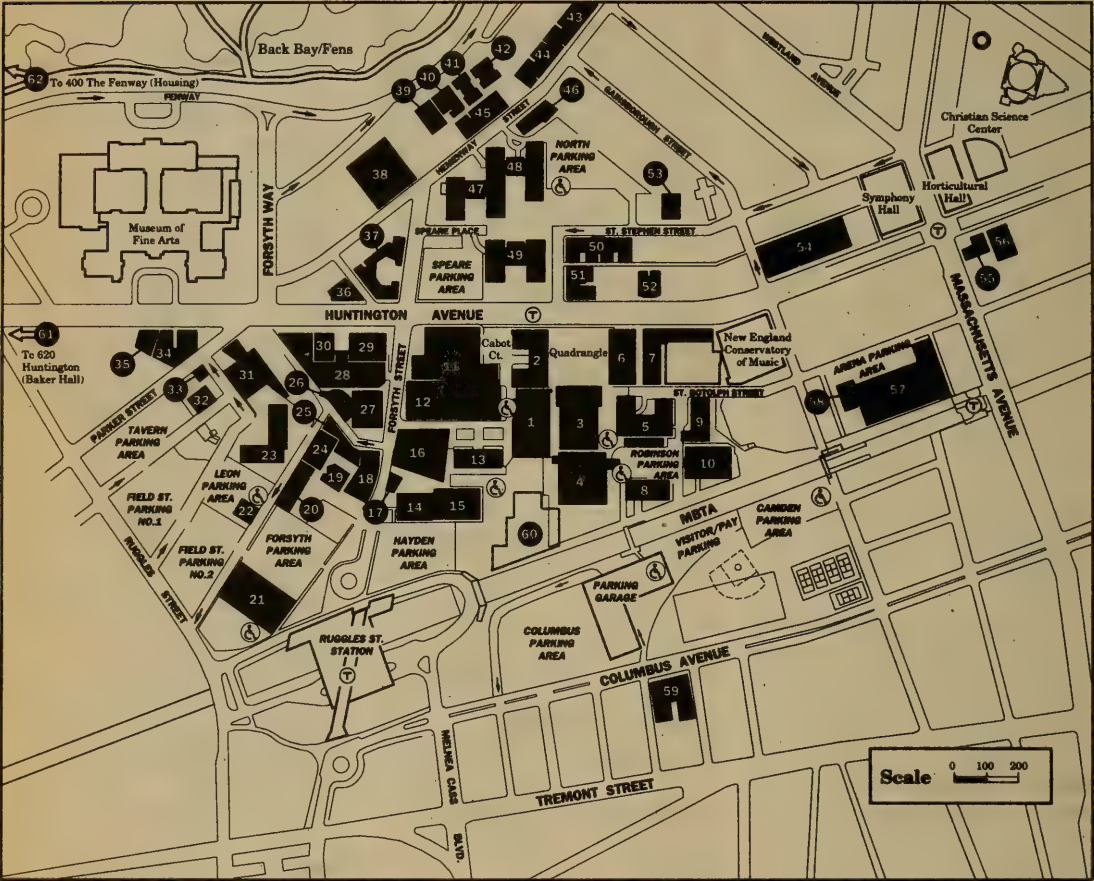
Raoul Smith

Michael T. Vaughn

Nancy L. Walden

Eileen Zungolo

Campus Maps



Academic and Service Buildings

- 22 African-American Institute (AF)
- 12 Barletta Natatorium (BN)
- 19 Boiler Plant
- 7 316 Huntington Ave.
(Northeastern at the YMCA)
- 11 Cabot Physical Education Building (CB)
- 39 Cahners Hall (CA)
- 28 Cargill Hall (CG)
- 13 Churchill Hall (CH)
- 59 Columbus Place
(716 Columbus Avenue) (CP)
- 9 Cullinane Hall (CN)
- 40 Cushing Hall (CU)
- 14 Dana Research Center (DA)
- 27 Dockser Hall (DK)
- 6 Dodge Library (DG)
- 3 Eli Student Building (Auditorium) (EL)
- 4 Eli Student Center (Student Lounge) (EC)
- 16 Forsyth Building (FR)
- 17 Forsyth Building Annex (FA)
- 38 Forsyth Dental Building (FE)
- 1 Hayden Hall (HA)
- 33 Hillel-Frager (HF)
- 24 Holmes Hall (HO)
- 56 236 Huntington Avenue (HU)

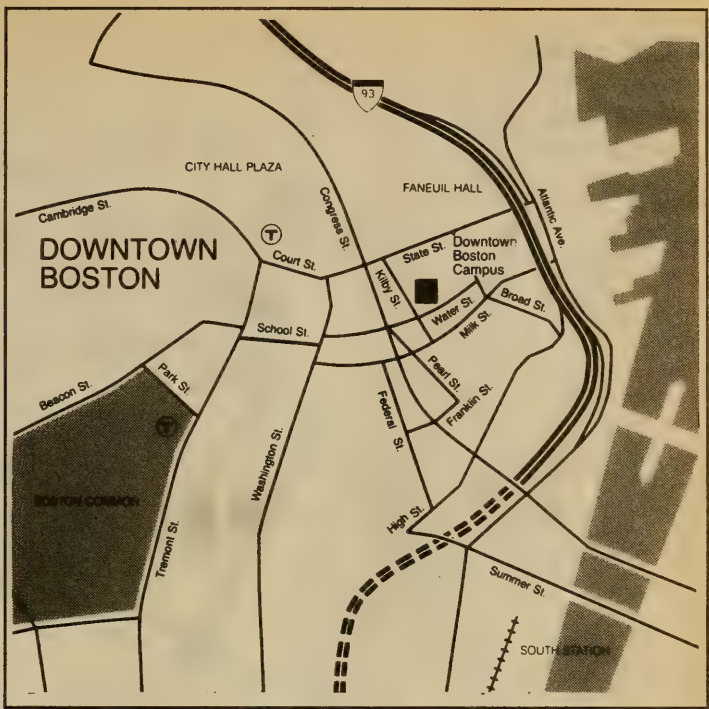
- 54 Huntington Plaza
(271 Huntington Avenue) (HN)
- 10 Hurtig Hall (HT)
- 26 Kariotis Hall (KA)
- 41 Kerr Hall (Faculty Center) (KH)
- 29 Knowles Center (Gryzmish Hall) (KG)
- 29 Knowles Center (Volpe Hall) (KV)
- 25 Lake Hall (LA)
- 60 Library Resource Center,
under construction
- 57 Matthews Arena (MA)
- 58 Matthews Arena Annex (MX)
- 20 Meserve Hall (ME)
- 5 Mugar Life Science Building
(Peabody Health Professions Center) (MU)
- 18 Nightingale Hall (NI)
- 31 Parker Building (PA)
- 5 Peabody Center
- 2 Richards Hall (RI)
- 8 Robinson Hall (RB)
- 21 Ryder Hall (RY)
- 15 Snell Engineering Center (SN)
- 50 122 St. Stephen Street (SS)
- 30 Stearns Center (ST)
- 55 Symphony Place
(334 Massachusetts Avenue) (SY)
- 32 26 Tavern Road (TA)

Key

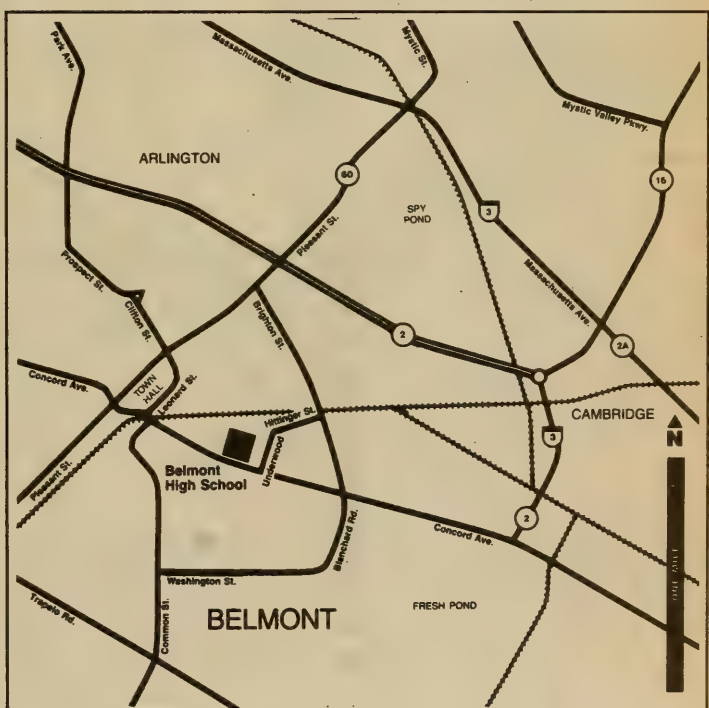
- Academic, Residential, and Service Buildings
- Handicapped Parking
- Street Direction

Maps are provided by the Information Center 116 Richards Hall, extension 2736. Some buildings on this map are used but not owned by Northeastern University.

Boston Downtown Campus
5 Liberty Square
(Corner of Kilby and
Water Streets)



Belmont High School
221 Concord Avenue



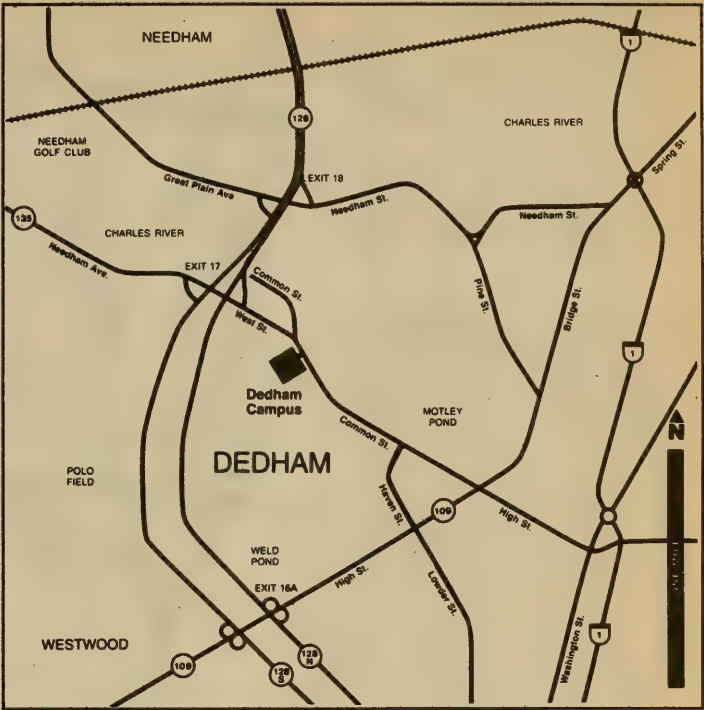
Burlington Campus
 South Bedford Road
Burlington High School
 123 Cambridge Street



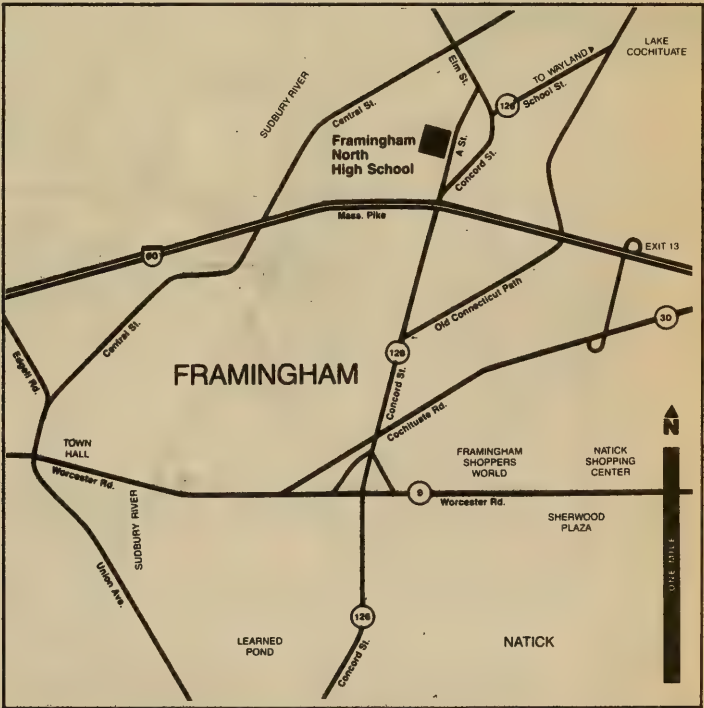
Chelmsford High School
 200 Richardson Road



Dedham Campus
370 Common Street



Framingham North High School
A Street



Marlboro High School
Bolton Street



Marshfield High School
Forest Street



Milford High School
31 West Fountain Street



Peabody Veterans Memorial High School
485 Lowell Street



Stoneham High School
Franklin Street



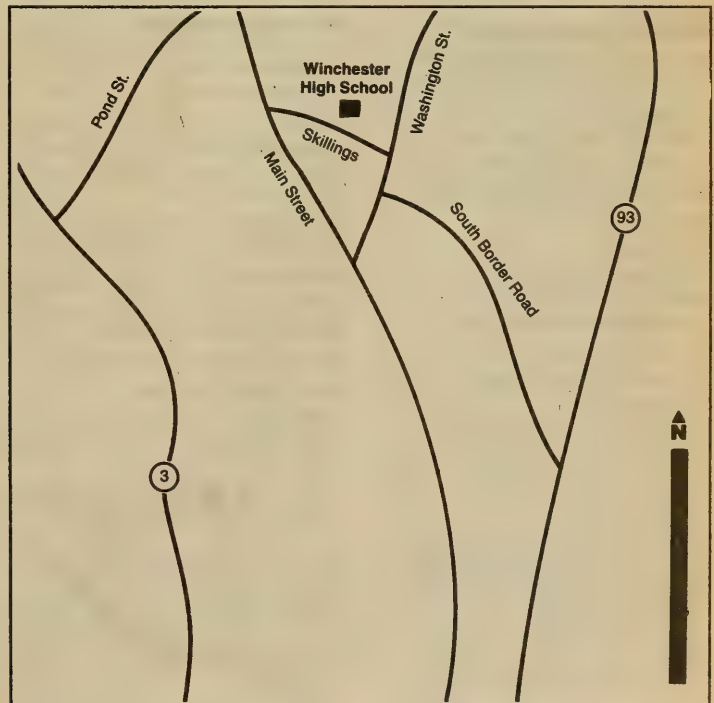
Westwood High School
200 Nahatan Street



Weymouth North High School
1051 Commercial Street



NEW LOCATION!
Winchester High School
80 Skillings Road



Index

A

Absence, 13
Academic advising, 5-8
Academic and Student Affairs,
Office of, 6, 35
Academic calendar, 2-3
Academic Computer Services, 261
Academic counseling, 5-8
Academic and life skills
development workshops, 8
Academic integrity, 15
Academic monitoring, 16
Academic policies and
procedures, 12-27
Academic probation, 19
Academic programs: *see* Programs
of study
Academic Standing Committee,
16, 288
Accounting
certificate program, 37
courses, 131-132
degree programs, 67-68, 76-77
Graduate School of
Professional, 265
for hospitality industry, 187
program consultants, 60
Acting courses, 157-159
certificate courses, 37
Activity Leader
certificate program, 108
Address change, 13
Administrative officers, 298
Admission
to degree program, 18
of international students, 14
open enrollment policy on, 12
Adolescent Care
concentration in Human
Development Services, 45
Adult Learners Program, 252
Advanced tutorial, 21
Advertising
certificate program, 37
courses, 190-191
program consultant, 110-111
Advising, academic, 6-8
African-American Studies
courses, 133
Allied health: *see* Health
Professions and Sciences
Alternative Freshman-Year
Program, 127-129
Alumni Association, 258
American Sign Language (ASL)
certificate programs, 38, 54-55
courses, 142-144
program consultant, 110-111
Anatomy courses, 145

Anthropology
courses, 234-235
degree programs, 124
program consultants, 110-111
APICS, 57
Arabic courses, 192
Art
courses, 133-142
program consultants, 110-111
Arts and Sciences: *see also*
Liberal Arts
College of, 263, 265
degree program, 112
track, in Alternative
Freshman-Year Program, 129
ASL: *see* American Sign
Language (ASL)
Assessment of Prior Learning
(APL), 24
Astronomy courses, 171
Athletic facilities, 257
Attendance
of classes, 13
at graduation, 29
Auditing
courses on, 132
policy for, 13
of seniors, 29
Awards, 256

B

Bachelor of Science in Business
Administration (BSBA) degree
program, 63
special requirements, 63-65
Belmont High School
map of, 305
office hours, 10
registration at, 2
Biology
courses, 144-147
program consultant and
coordinator, 91
Biomedical illustration,
certificate program in, 38
Biotechnology, 93-95
degree programs, 93
Board of Inquiry, 16, 299
Boston Library Consortium, 261
Boston Main Campus
map of, 304
office hours, 10
registration at, 2
Boston-Bouvé College of Human
Development Professions,
263-264
Botanical Research Station, 260
BSBA degree program, 63-65
Building Technology Program, 267
Burlington High School
map of, 306
office hours, 10

registration at, 2
Burlington Suburban Campus
map of, 306
office hours, 10
registration at, 2
Bursar's Office, 248
Business Administration: *see also*
Management
associate in science degrees in, 68
bachelor of science in, 63-64
certificate program, 39
College of, 263
Curriculum Committee, 299
degree programs, 32-33, 60-84
master of, 265
program consultants, 60-84
reserved and open sections in,
65-67
track, in Alternative
Freshman-Year Program, 128
validation requirements for, 22
Business communication,
certificate program in, 39
Business law
courses, 148
program consultant in, 60

C

C.P.M., 57-58, 62
Calendar, 2-3
Campuses,
facilities, 304
maps, 304-311
office hours, 10-11
registration at, 2-3
Cancellation, of courses, 13
Cardiovascular health and
exercise course, 216
Career counseling and testing
service, 7
Career development course, 6
Career development and
placement, 6, 190
Career Expos, 7
Career Resource Center, 7
Career transition, 57
Certification preparation,
C.P.M., 57-58, 62
CPIM, 57-58, 62
Certificate petition, 15
Certificate programs, 35-53
intermediate and advanced,
54-57
accounting, 37
acting, 37
activity leader, 108
advertising, 37
American Sign Language and
Deaf Studies, 38
American Sign Language-
English Interpreting, 54-55
biomedical illustration, 38
business administration, 39

- business communication, 39
 - career transition, 57
 - compensation and benefits management, 40
 - computer graphic design, 42
 - computer programming and systems analysis, 40
 - computer systems specialist, 41
 - culinary arts (Chef's Institute), 42
 - electronic composition, 43
 - executive management, 55
 - finance, 43
 - food service management, 43
 - gerontology, 45
 - graphic design and visual communication, 44
 - health record administration, 55
 - hotel and restaurant management, 44
 - human development services, 45
 - human resources management, 46
 - international business, 56
 - law and criminal justice, 46
 - learning disability concentration, 45
 - management, 47
 - marketing, 47
 - micro-computer software specialist, 47
 - National Institute for the Food Industry Certificate, 57
 - operations management, 48
 - phlebotomy, 58
 - policing, 48
 - professional parenting, 45
 - public relations, 48
 - purchasing and materials management, 49
 - quality management, 49
 - real estate, 49
 - security administration, 50
 - security technology, 50
 - small business, 50
 - speech communication, 51
 - technical writing, 51
 - transition to higher education, 58
 - transportation and physical distribution management, 52
 - ultrasonography studies, 52
 - within degree programs, 19
 - writing, 53
- Cheating, 15**
- Chef's Institute Certificate, 42**
- Chelmsford High School**
map of, 306
office hours, 10
registration at, 2
- Chemistry**
courses, 148-150
program consultant and coordinator, 91
- Cinema courses, 137**
- Classes**
attendance at, 13
cancellation of, 13
size of, 4
- CLEP examinations, 23, 65**
- Clinical assignments, 92, 101-102**
- Clubs, 257**
- Code of Student Conduct, 15-16**
- College Level Examination Program (CLEP), 23, 65**
- Commencement: see Graduation**
- Commencement Data Card, 29**
- Communication: see also Writing**
business, 39
for health care personnel, 176
speech, 240-241
technical, 242-244
visual, 133-142
- Community health management courses, 175-177**
specialization in, 96
- Compensation and benefits management, certificate program in, 40**
- Computer Graphic design certificate, 42**
- Computer literacy course, 157**
- Computer programming and systems analysis: see also technical communications**
certificate program, 40
- Computer Science, College of, 263**
- Computer services, 261**
- Computer Systems Specialist Program, 41**
- Computer-aided graphic design, courses in, 133-142**
- Conduct, Code of Student, 15-16**
- Conservation courses, 170-172**
- Consumer advocacy courses, 223**
- Contemporary studies seminar, 190**
- Continuing care administration courses, 176**
specialization in, 96
- Continuing Education, Division of, 266**
- Cooperative Plan of Education, 259**
- Copyediting courses, 191, 242**
- Copying, of other students' work, 15**
- Corrections**
consultants, 85
courses, 150-157
degree programs, 33, 86-87
- Counseling and Testing Center, 8**
- Counseling services, 8, 190**
- Courses**
auditing of, 132
cancellation of, 13
- change in required, 13
description of, 130-246
field work, 21
intensive, 249
maximum number of, 14
at other institutions, 23
overload of, 14
pass/fail, 14, 27
prerequisite, 15
registration for, 2-3, 12-17, 248
at remote locations, 268
repeating, 26
reserved and open sections of, 65
schedule of, 12
selection of, 12
sequential, 65
substitution of, 20
validation of, 23, 65
withdrawal from, 15
- C.P.M. and CPIM, 57-58, 62**
- Creative process course, 190**
- Credential service, 7**
- Credit**
for bachelor of science in business administration, 22
for certificate programs, 35
by examination, 23, 65
for extra-institutional learning, 25
for international students, 23
quarter-hour, 13
transfer, 22-25
- Credit hours, 13**
- Criminal Justice and Security certificate programs, 33**
College of, 263
consultants, 85
courses, 150-157
programs in, 33, 85-90
Programs Committee, 299
track, in Alternative Freshman-Year Program, 129
- Culinary Arts Certificate, 42**
- Cultural heritage seminar, 190**
- Cumulative quality-point average, 27**
- Curricula: see Programs of study**
- Curriculum committees, 299**
-
- D**
- Dance facilities, 257**
- Data processing courses, 199-203**
- Dean's List, 20**
- Dedham Campus,**
map of, 307
office hours, 10
registration at, 2
- Deferred payment plan, 248**
- Degree programs, 18-21**
for additional degree, 19
admission to, 18
in business administration, 60-84
certificates contained within, 19

in criminal justice and security, 33
in health professions and sciences, 33
in liberal arts, 34
policies and procedures, 18-21
transfer into, 32
Dental school admission requirements, 92
Departmental examination, 65
Design, graphic
 certificate program, 44
 courses, 133-142
 degree programs, 116, 117
 program consultants, 110-111
Disabilities, resources for, 9
Disciplinary action, 16
Downtown Boston Campus
 map of, 305
 office hours, 10
 registration at, 2
Drama courses, 157-159
E
Earth Sciences
 courses, 170-172
 program consultant, 91
Ecology courses, 145
Economics
 courses, 159-163
 degree programs, 113
 program consultants, 110-111
Editing courses, 191, 242
Education track, in Alternative Freshman-Year Program, 163
Educational-vocational counseling, 68
Electronic publishing
 composition certificate, 43
 courses, 43
 degree program, 79
Ell Student Center, 257
 fee for, 249
Emergency medical technician (EMT)
 basic program, 59
 courses, 164
Employer, tuition payment by, 249
Engineering
 College of, 263
 State-of-the-Art Program, 267
Engineering Technology, School of, 264
English
 as a second language, 165
 courses, 165-169
 degree programs, 114
 placement tests, 15
 program consultants, 110-111
Enrollment, 12
Epidemiology courses, 207

Examinations
 CLEP, 23, 65
 course, 14
 credit by, 23, 65
 departmental, 65
 final, 14, 27
 makeup, 20, 250
 modern language proficiency, 23
 PEP, 23, 65
 placement, 15
 Test Preparation Program for, 267
 for validation, 22
Executive Committee, 298-299
Executive management certificate, 55
Exercise
 course, 216
 facilities, 257
Extra-institutional learning, 25
F
Facilities
 map of, 304
Faculty, 269-297
Family Educational Rights and Privacy Act, 16
Fees
 Alternative Freshman-Year Program, 128
 auditing, 13
 intensive courses, 249
 international transfer credit, 23
 job notices, 7
 laboratory, 249
 late payment, 249
 mandatory medical insurance, 250
 missed final examination, 250
 registration, 248
 student center, 249
 transcripts, 250
 tuition, 248-250
Field work courses, 21
Film courses, 137
Final examinations
 dates for, 3
 missed, 27
 policy for, 14, 27
Finance
 certificate programs, 43
 courses, 172-174
 degree programs, 69, 77
 program consultants, 60
Financial aid, 250-251
Financial Services Institute, 267
Fine arts
 courses, 133-142
 degree programs, 115-116
Food service management
 certificate program, 43
 courses, 187-188
 program consultant, 60

Foreign languages
 courses, 192-195
 proficiency examinations, 23
 program consultant, 110-111
Foreign students
 English for, 165
 enrollment of, 14
 speaking skills for, 240
 transfer credit for, 23
Framingham North High School
 map of, 307
 office hours, 10
 registration at, 2
French courses, 192
Freshman-Year Program, Alternative, 127-129
Friday intensives, 249

G

Gemology course, 170
Genetics courses, 146
Geology courses, 170
German courses, 192
Gerontology
 concentration, 45
 courses, 237
Grade Change Policy, 26
Grade reports, 26
Grade-point average, 26-27
Grading system, 26-27
Graduate schools
 credential service for, 7
 at Northeastern University, 264-266
Graduation
 attendance at, 29
 Commencement Ceremony, 29
 Commencement Data Card, 29
 date of, 3
 with honor, 28
 policies and procedures for, 28-29
 requirements for, 28
 senior status and, 28-29
Grants, 251-252
Graphic design and visual communication
 certificate program, 44
 courses, 133-142
 degree programs, 112, 116-117
 program consultants, 110-111
H
Handicapped, Office of Services for the, 9
Health Center, 248
Health management
 courses, 175-177
 degree programs, 33
 program consultant, 91
Health Professions and Sciences Advisory Committee, 299

certificate programs, 33
 clinical assignments, 92
 Curriculum Committee, 299
 degree programs, 33
 medical school admission requirements, 92
 preprofessional medical courses, 92
 program directors and coordinators, 91
 track, in Alternative Freshman-Year Program, 129
 Health record administration certificate program, 99
 courses, 177-178
 degree program, 97-98
 program consultant and coordinators, 91
 Health science courses, 180-181
 degree program, 99-100
 program consultant, 91
 track, in Alternative Freshman-Year Program, 129
 Hebrew courses, 193
 Hematology courses, 207
 Henderson House, 260
 Histology courses, 146
 History courses, 182-187
 degree programs, 118-119
 program consultants, 110-111
 Holidays, 3
 Homework, 14
 Honor Dean's List, 20
 graduation with, 28
 Honor society, 257
 Honors program, 21
 Hotel and restaurant management certificate programs, 44
 courses, 187-188
 degree program, 70
 program consultant, 60
 Human development services certificate, 45
 Human resources management certificate program, 46
 courses, 178-180
 degree program, 70-71
 program consultants, 60
 Humanities: *see* Arts and Sciences; Liberal Arts
I
 Illustration biomedical, certificate program in, 38
 courses in, 140, 147
 Immunology course, 147
 In *absentia* status, 20
 Incomplete grades, 26

Independent study, 21
 Infant/Child Care concentration, 45
 Insurance and Financial Services Institute, 267
 Intensive courses, 249
 Interdisciplinary courses, 190
 International Business, certificate, 56
 International students English for, 165
 enrollment of, 14
 speaking skills for, 240
 transfer credit for, 23
 Interpreting, sign language, 38, 54
 Italian courses, 193
J
 Japanese courses, 193-194
 Job counseling, 7, 190
 Job placement services, 7, 190
 Job-search seminars, 7
 Journalism courses, 190-191
 program consultant, 110-111
 Judicial Advisor, 299
 Judicial procedures, 17
L
 Laboratory fees, 249
 Laboratory science, medical courses, 206-207
 degree programs, 33
 program director and coordinator, 91
 Lane Health Center, 258
 Language skills courses, 240
 Languages: *see also* English foreign, 192-195
 sign, 34, 142-144
 Late payment fee, 249
 Latin courses, 194
 Law and Criminal Justice certificate, 46
 courses, 164
 for criminal justice, 150-157
 for health sciences, 175
 for hotel and restaurant management, 187
 for political science, 222
 for real estate, 231
 School of, 266
 for sociology, 237
 Law enforcement: *see* Criminal Justice and Security
 Learning Disabilities concentration, 45
 Learning Resources Center, 260-261
 Liberal Arts: *see also* Arts and Sciences

Assessment of Prior Learning (APL), 24, 112
 certificate programs, 34
 Curriculum Committee, 299
 degree programs, 111-126
 program consultants and advisors, 110-111
 special studies, 21
 Liberal Studies degree program, 111, 120-121
 Libraries, 260-261
 Library Advisory Committee, 299
 Life skills development workshops, 8
 Linguistics course, 168
 Literature courses, 165-169
 degree programs, 34
 program consultants, 110-111
 Long-term care administration courses, 176
 specialization in, 95-96
M
 Major change of, 19
 second, 19
 Make up for final examination, 27
 for incomplete grades, 27
 Management: *see also* Business Administration certificate program, 47
 courses, 196-199
 degree programs, 80
 program consultants, 60
 Management Development, Center for, 263
 Management information systems (MIS) courses, 199-203
 degree programs, 71-72, 81
 program consultants, 60
 Management sciences courses, 207-208
 program consultant, 60
 Maps, 304-311
 Marine Science and Maritime Studies Center, 260
 Marketing certificate program, 47
 courses, 203-206
 degree programs, 72, 83
 program consultants, 60
 Marlboro High School map of, 308
 office hours, 10
 registration at, 2
 Marshfield High School map of, 308
 office hours, 10
 registration at, 2

Mass Transit Program, 267
 Massachusetts Adult Learners Program, 252
 Massachusetts Financial Aid Form (MFAF), 252
 Massachusetts Part-Time Student Grant Program, 251
 Massachusetts State Scholarship, 251
 Master of business administration (MBA) program, 265
 Mathematics courses, 208–210
 placement tests, 15
 program consultant, 91
 MBA program, 265
 Media courses, 190
 program consultants, 110–111
 Medical care, 258
 Medical courses, preprofessional, 92
 Medical laboratory science (MLS) courses, 206–207
 degree programs, 101–102
 program director and coordinator, 91
 Medical school admission requirements, 92
 Medical technology courses, 207
 degree programs, 101
 program director and coordinator, 91
 Meteorology courses, 170–172
 Microcomputer Software Specialist, certificate, 47
 Milford High School map of, 309
 office hours, 10
 registration at, 2
 MIS: *see* Management information systems (MIS)
 MLS: *see* Medical laboratory science (MLS)
 Modern Information Systems, 82
 Modern languages courses, 192–195
 proficiency examinations, 23
 program consultant, 110–111
 Monitoring, 16
 Music courses, 210–215
 program consultants, 110–111
 tutorials, 249–250
 Music therapy courses, 210–215

N

Name change, 13
 NAPM, 58
 National Career Network, 8

National Institute for Food Industry certificate, 57
 Network Northeastern, 268
 Northeastern University campuses of, 259, 304–311
 computer services at, 261
 facilities of, 257–258
 graduate schools of, 264–266
 libraries at, 260
 maps of, 304–311
 profile of, 259
 programs at, 256–259
 research at, 261–262
 undergraduate colleges of, 263–266
 Nursing College of, 264, 266
 courses, 215–216
 degree programs, 103
 program coordinator, 91
 Nutrition courses, 180

O

Oceanography courses, 170
 Office hours, 10–11
 Office of Services for the Handicapped (OSH), 9
 On-Campus Recruiting, 7
 Open enrollment policy, 12
 Open houses, 5
 Open sections, in BSBA programs, 65
 Operations management certificate program, 48
 courses, 189–190
 degree program, 73
 Operations Technology, certificate, 48
 courses, 189–190
 degree programs, 63, 78–79
 Oral microbiology course, 181
 Orientation, 5
 OSH, 9

P

Paralegal Program, 267
 Paramedic Technology Program, degree, 104–105
 Parasitology course, 147
 Part-time Student Grant Program, 251
 Pass/fail courses, 14, 27
 Peabody Veterans Memorial High School map of, 309
 office hours, 10
 registration at, 2
 Pell Grant, 251
 PEP examinations, 23, 65
 Periodontology courses, 181
 Personal counseling, 8

Pharmacology courses, 180, 215
 Pharmacy and Allied Health Professions, College of, 264, 266
 Philosophy courses, 216–219
 program consultant, 110–111
 Phlebotomy certificate, 58
 Photography courses, 136, 191
 Physical Education course, 216
 Physics courses, 219–220
 Physiology courses, 145
 Placement services, 6, 190
 Placement tests, 15; *see also* CLEP examinations; PEP examinations
 Plagiarism, 15
 Policies and procedures for admission to degree program, 18
 for enrollment and registration, 12
 for grading, 26–27
 for graduation, 28–29
 for transfer credit, 22–25
 Policing certificate, 48
 courses, 150–157
 degree programs, 88
 Political science courses, 220–223
 degree programs, 121–123
 program consultants, 110–111
 Preprofessional medical courses, 92
 Prerequisites, 15
 Probation, academic, 18
 Professional clubs, 257
 Professional preparation programs, APICS, 57
 NAPM, 58
 Proficiency Examination Program (PEP), 23, 65
 Programs of study, 32–34
 Alternative Freshman-Year, 127–129
 in business administration, 32–33, 60–84
 certificate programs, 35–59
 changes in, 19
 in criminal justice and security, 33, 85–90
 degree programs, 32–34, 60–126
 in health professions and sciences, 33, 91–109
 in liberal arts, 34, 110–126
 Psychology courses, 224–226
 degree programs, 123–124
 program consultants, 110–111
 Public health courses, 181

Public relations
certificate program, 48
courses, 191, 204
program consultant, 110-111

Purchasing and materials
management
certificate program, 49
courses, 227-228
degree program, 73
exam prep, 62
program consultant, 60

Q

Quality control
courses, 141, 207-208, 229
program consultant, 60

Quality Management
certificate, 49

Quality-point average, 27

Quarter-hour credit, 13

R

Radiologic technology
courses, 228-229
degree programs, 105-107
program directors, 91

Reading and study skills
course, 163

Real estate
Salesperson examination
preparation, 58
certificate program, 49
courses, 229-231
degree program, 74
program consultant, 60

Records, inspection of student, 16

Refund, of tuition, 249

Registrar, Office of, 10

Registration
dates for, 2-3
fee for, 248
procedures for, 12-17

Religion
courses, 218-219, 235
program consultant, 110-111

Remote-site instruction, 268

Requirements
changes in, 20
for graduation, 28
residence, 28
substitutions for, 20, 35
validation of, 22

Research
for criminal justice, 151
for economics, 162
for electronic publishing, 141
for marketing, 204
at Northeastern University,
261-262
for nursing, 216
for political science, 221
for sociology, 239

Reserved sections, in BSBA
programs, 65

Residence requirement, 28

Responsibilities of students, 17

Rights, of students, 17

Robbins Prize, 256

Russian courses, 194-195

S

Sales courses, 204

Saturday intensives, 249

Schedule
for academic year, 2-3
of courses, 12

Scholarships, 253-256

Science Programs Curriculum
Committee, 299

Security: *see also* Criminal
Justice and Security
Administration certificate, 50
courses, 150-157
degree programs, 89, 90
technology certificate, 50

Self-assessment and career
development, 190

Semantics course, 168

Seniors
academic audit of, 29
credit by examination for, 28
status reports for, 28-29

Sigma Epsilon Rho honor society,
257

Sign language
certificate programs, 38-54
courses, 142-144
program consultant, 110-111

Small business management
certificate program, 50
courses, 197

Social clubs, 257

Sociology-Anthropology
courses, 234-239
degree programs, 124-126
program consultants, 110-111

Spanish courses, 195

Speaking skills, for international
students, 240

Special Programs, 57-59

Special students, 15

Special studies, 20, 86

Speech communication
certificate program, 51
courses, 240-241
program consultant, 110-111

Sports facilities, 257

Stafford Student Loan Program,
252

State Scholarship, 251

State-of-the-Art Engineering
Program, 267

Statistics
courses in, 160

for health sciences, 175
for psychology, 224
for quality control, 207

Status reports
academic, 21
senior, 28-29

Stoneham High School
map of, 310
office hours, 10
registration at, 2

Student Center,
fee for, 249

Student records, inspection of, 16

Students, 5

Study skill course, 163

Study Skills Development
Workshop, 8

Substitution, of courses, 20

Suburban campuses,
maps of, 304-311
office hours, 10-11
registration at, 2-3

Swedish courses, 194

Systems analysis
courses, 202

T

Taxation courses, 131-132

Technical communication
courses, 242-244
degree program, 126
program consultant, 110-111

Technical writing
certificate program, 51
courses, 242-244

Telecast instruction, 268

Test Preparation Program, 267

Testing, at Counseling and
Testing Center, 8

Tests: *see* Examinations

Theatre courses, 157-159

Therapeutic recreation
certificate program, 108
courses, 231-234
Curriculum Committee, 299
degree programs, 107
program director, 91

Transcripts
fee for, 250
obtaining, 26
for transfer credit, 22

Transfer credit
for certificate programs, 35
by examination, 23, 65
for extra-institutional learning,
25
for international students, 23
procedure for, 22
in senior year, 28
validation in BSBA program, 22

Transition programs
certificate, 57-58

Transportation and physical
distribution management
certificate program, 52
courses, 244-246
degree program, 74
program consultant, 60

Tuition,
and fees, 248-250
for Alternative Freshman-Year
Program, 128
financial aid for, 251-252

Tutorial services, 6

U

Ultrasonography studies,
certificate, 52

Undergraduate colleges, 263-264

University College
administrative officers of,
298-299
class size at, 4
convenience of, 5
counseling services at, 6-8
faculty of, 5, 269-297
office of, 8-9
profile of, 4
programs at, 4, 32-34
students at, 5

Urban Mass Transit Program, 267

V

Vacations, 3

Validation
in BSBA degree program, 22, 65
in Nursing, 23

Veterans' benefits, 249

Vocational counseling, 6-8, 190

W

Warren Center, 260

Westwood High School
map of, 310
office hours, 10
registration at, 2

Weymouth North High School
map of, 311
office hours, 10
registration at, 2

Winchester High School
map of, 311
office hours, 10
registration at, 2

Withdrawal, from course
absence, 13
procedure for, 15
tuition refund, 249

Writing: *see also* Communication
certificate program, 53
courses, 165-169
degree programs, 114
placement tests, 15
program consultants, 110-111
technical, 51

X

X-ray technology
courses, 228-229
degree programs, 105-107
program directors, 91

Northeastern University's Mission

Northeastern University's mission, as a large urban university founded on the cooperative model of education, is to provide excellence in education. The University achieves its mission through curricula that value equally knowledge for its own sake, knowledge as a means to success in the workplace, and knowledge as a cornerstone of personal achievement and satisfaction.

Achieving Northeastern University's mission requires excellence in teaching, and teaching remains the central activity of Northeastern's faculty. By offering undergraduate and graduate programs that are rigorous, relevant, and rewarding, the University provides a solid structure for educational excellence. Northeastern University is also committed to the search for knowledge through the scholarly and artistic undertakings of its faculty and students.

A central mandate of

Northeastern University is to offer students the opportunity to apply directly lessons of the classroom and laboratory to the workplace through cooperative education. For three quarters of a century, cooperative education has been the keystone of Northeastern's uniqueness. As an increasing percentage of the nation's population enters the workforce, and new technologies continue to change the nature of work, the University has rededicated itself to helping the cooperative plan keep pace with those changes.

Northeastern University is committed to serving the educational needs of a diverse student population in an amenable physical environment. The University believes that its mission can be achieved only if the student body is not limited by economic status, cultural or racial background, geographic origin, sex, or age. Northeastern has a long history of

serving the educational needs of the non-traditional student, providing degree and non-degree programs for people whose circumstances prevent them from following the standard college regimen.

Looking beyond the confines of the campus, Northeastern University is determined to maintain and strengthen its reputation as a friend to the City of Boston and a partner of the Commonwealth of Massachusetts. The University's obligation to serve the community of which it is an integral part is fulfilled primarily through the educational enterprise. Through its numerous outreach programs, the University has made striking contributions to the community in the applied social sciences, in high technology, and in the arts. Northeastern University will continue to contribute in these and other ways to the region's overall quality of life and to its economic vitality.

Accreditation

Northeastern University is accredited by the New England Association of Schools and Colleges, Inc., which accredits schools and colleges in the six New England states.

Accreditation by the Association indicates that the institution has been carefully evaluated and found to meet standards agreed upon by qualified educators. The undergraduate business

programs offered by Northeastern University are accredited by the American Assembly of Collegiate Schools of Business.

Equal Opportunity Employment Policy

Northeastern University does not discriminate on the basis of race, color, religion, sex, sexual preference, age, national origin, or veteran or handicapped status in admission to, access to, treatment in, or employment in its programs and activities. In addition, Northeastern University will not condone any form of sexual harassment. Handbooks containing the Univer-

sity's nondiscrimination policies and its grievance procedures are available in the Office of Affirmative Action, 175 Richards Hall. Inquiries regarding the University's nondiscrimination policies may be directed to: Ellen S. Jackson, Dean/Director, Office of Affirmative Action, 175 Richards Hall, Northeastern University, Boston,

Massachusetts 02115, (617) 437-2133.

Inquiries concerning the application of nondiscrimination policies may also be referred to the Regional Director, Office for Civil Rights, United States Department of Education, J.W. McCormack Building, Post Office Court House, Room 2222, Boston, Massachusetts 02109-4557.

Delivery of Services

The University assumes no liability, and hereby expressly negates the same, for failure to provide or delay in providing educational or related services or facilities or for any other failure or delay in performance arising out of or due to causes beyond the reasonable control of the University, which causes include, without limitation, power failure, fire, strikes by University employees or others, damage by the elements, and acts of public authorities. The University will, however, exert reasonable efforts, when in its judgment it is appropriate to do so, to provide comparable or substantially equivalent services, facilities, or performance, but its inability or failure to do so shall not subject it to liability.

The Northeastern University catalog contains current information regarding the University calendar, admissions, degree requirements, fees, and regulations, and such information is not intended to be and should not be relied upon as a statement of the University's contractual undertakings.

Northeastern University reserves the right in its sole

judgment to promulgate and change rules and regulations and to make changes of any nature in its program, calendar, admissions policies, procedures and standards, degree requirements, fees, and academic schedule whenever it is deemed necessary or desirable, including, without limitation, changes in course content, the rescheduling of classes, cancelling of scheduled classes and other academic activities, and requiring or affording alternatives for scheduled classes or other academic activities, in any such case giving such notice as is reasonably practicable under the circumstances.

Northeastern will do its best to make available to you the finest education, the most stimulating atmosphere, and the most congenial conditions it can provide. But the quality and the rate of progress of your academic career is in large measure dependent upon your own abilities, commitment, and effort. This is equally true with respect to professional advancement upon completion of the degree or program in which you are enrolled. The University cannot

guarantee that you will obtain or succeed at any particular job; that will depend upon your own skills, achievement, presentation, and other factors such as market conditions at that time. Similarly, in many professions and occupations there are increasing requirements imposed by federal and state statutes and regulatory agencies for certification or entry into a particular field. These may change during the period of time when you are at Northeastern, and they may vary from state to state and from country to country. While the University stands ready to help you find out about these requirements and changes, it is your responsibility to initiate the inquiry because the University has no other way of knowing what your expectations and understandings are.

In brief, the University is there to offer you educational opportunities and to assist you in finding the direction in which you want to steer your educational experience. But you are a partner in this venture with an obligation and responsibility to yourself.

Family Educational Rights and Privacy Act

In accordance with the Family Educational Rights and Privacy Act of 1974, Northeastern University permits its students to inspect their records wherever appropriate

and to challenge specific parts of them when they feel it necessary to do so. Specific details of the law as it applies to Northeastern are printed in the Student

Handbook and are distributed annually at registrations of University College and the graduate schools.

Office of Services for the Handicapped

The Office of Services for the Handicapped (OSH) provides a variety of support services and general assistance to all

of Northeastern's disabled students and employees. The University's efforts to comply with the Rehabilitation Act

of 1973 are coordinated by Ruth Bork, OSH director, 5 Ell Center, 617-437-2675.

Disclaimer

Tuition rates, all fees, rules and regulations, and courses and course content are subject to revision by the President and the Board of Trustees at any time.

Emergency Closing of the University

Northeastern University has made arrangements to notify students, faculty, and staff by radio when it becomes necessary to cancel classes because of extremely inclement weather. AM radio stations WBZ (1030), WEEI (590), WHDH (850), WRKO (680), and FM stations WBCN (104.1), and WROR (98.5) are authorized to announce the University's decision to close. The TTY telephone number (a teletype machine) for the hearing impaired only is 437-8516. Since instructional television courses originate from live or broadcast facilities at the University, neither the classes nor the courier service operate when the University is closed.

Basic Day Colleges Curriculum Guide and Course Descriptions

1990-1991



Northeastern University

Northeastern University

**Basic Day Colleges
Curriculum Guide and
Course Descriptions**

1990–1991

In 1837, Mary Harris Thompson crossed a threshold that transformed the medical profession. By becoming the nation's first female surgeon, she unlocked a door for all women, inspiring those who believed the future was closed to them. Since then thousands have proceeded through that gateway.

To travel across a threshold, one must venture uncharted horizons. By zealously pursuing their goals, pioneers like Amelia Earhart, Albert Einstein, Florence Nightingale, and Jesse Owens revealed boundless opportunities for future generations. Their accomplishments have broadened our vistas.

As the twenty-first century approaches, advances in fields such as technology, business, and education increasingly will require people who embrace the unknown. As you choose your field you embark on a lifelong process of learning. By exploring new concepts and divergent viewpoints in your undergraduate studies, you prepare your personal and professional contributions. You now begin opening doorways for your own future as well as for all those who come after you.

Contents

Curriculum Guide 1990–1991

| | | | |
|--|----|---|----|
| College of Arts and Sciences | 2 | College of Nursing | 44 |
| Boston-Bouvé College of Human Development Professions | 17 | College of Pharmacy and Allied Health Professions | 45 |
| College of Business Administration | 21 | University College Alternative Freshman-Year Program | 50 |
| College of Computer Science | 25 | The Writing Center | 51 |
| College of Criminal Justice | 30 | Middler Year Writing Requirement | 51 |
| College of Engineering | 31 | Basic College Compensatory Programs | 52 |
| School of Engineering Technology | 41 | | |

Course Descriptions

| | | | |
|---|-----|---|-----|
| Chemical Engineering (CHE) | 56 | Speech Communication (SPC) | 170 |
| Civil Engineering (CIV) | 58 | Theatre and Dance (DRA) | 172 |
| Electrical Engineering (ECE) | 60 | Accounting (ACC) | 176 |
| General Engineering (GE) | 65 | Entrepreneurship (ENT) | 178 |
| Industrial Engineering (IIS) | 66 | Finance and Insurance (FIN) | 179 |
| Mechanical Engineering (ME) | 68 | Human Resources Management (HRM) | 182 |
| Computer Science (COM) | 71 | International Business Administration (INB) | 183 |
| Engineering Technology (CHT), (CT), (EET), (GET), (MET) | 74 | Management (MGT) | 184 |
| African-American Studies (AFR) | 82 | Marketing (MKT) | 185 |
| American Sign Language (ASL) | 86 | Management Science (MSC) | 187 |
| Art and Architecture (ART) | 87 | Transportation (TRN) | 189 |
| Biology (BIO) | 91 | Counseling Psychology, Rehabilitation, and Special Education (CRS) | 190 |
| Chemistry (CHM) | 96 | Education (ED) | 191 |
| Cinema | 99 | Health, Sport, and Leisure Studies (HSL) | 195 |
| Economics (ECN) | 100 | Physical Therapy (PTH), (PCL), (PCT), (PHP), (PMC) | 203 |
| English (ENG) | 103 | Speech-Language Pathology and Audiology (SLA) | 205 |
| Geology (GEO) | 110 | Pharmacy (PAH) | 206 |
| History (HST) | 113 | Health Professions (HRA) | 210 |
| Interdisciplinary Courses (INT) | 119 | Toxicology (TOX) | 210 |
| Journalism (JRN) | 121 | Medical Laboratory Science (MLS) | 211 |
| Linguistics | 123 | Health Record Administration (HRA) | 213 |
| Modern Languages (LN), (LNC), (LNF), (LNS), (LNL), (LNG), (LNR), (LNI) | 124 | Respiratory Therapy (RTH) | 215 |
| Mathematics (MTH) | 133 | Nursing (NUR) | 217 |
| Music (MUS) | 138 | Criminal Justice (CJ) | 219 |
| Philosophy and Religion (PHL) | 143 | Military Science (AIR), (ARM), (NAV) | 221 |
| Physics (PHY) | 148 | Cooperative Education (COP) | 225 |
| Political Science (POL) | 151 | Alternative Freshman-Year Program | 225 |
| Psychology (PSY) | 157 | | |
| Anthropology (SOA) | 161 | | |
| Sociology (SOC) | 163 | | |

Appendix

Curriculum Guide

College of Arts and Sciences

The College of Arts and Sciences offers degree programs in twenty-two majors. In most majors, two degrees are offered: the bachelor of arts and the bachelor of science. Requirements specified by the department offering each major are listed on the following pages. In addition to the requirements specified by the department, the college has established certain minimum graduation requirements for students.

Quantitative. Candidates for either the bachelor of arts or bachelor of science degree must successfully complete 176 QH credits, of which 144 QH must be arts and sciences courses. In addition, only 4 QH of physical education and no ROTC credits may be used to meet this requirement.

Residency. Candidates must complete either 75 percent of the degree credit (132 QH) or the last three full quarters (a minimum of 12 four-credit courses) in the Northeastern University Basic Day Colleges.

Qualitative. Candidates must achieve a minimum cumulative average of 2.0 (grade of C).

The Core Curriculum

The College of Arts and Sciences core curriculum is required of all students.

The core curriculum is a set of requirements intended to provide students with the opportunity to gain the broad base of knowledge traditionally associated with a liberal arts education. The core gives students the opportunity to develop proficiency in basic skills; to be exposed to methods of analysis in the various subjects and disciplines in the arts and humanities, the social sciences, and the natural sciences and mathematics; and to become acquainted with ideas in Western culture, differing views in non-Western cultures, and major issues and problems facing contemporary society.

The core curriculum consists of six categories.

Category I Basic Skills:

- Freshman English (two or three courses)
- College mathematics
- Modern language through Intermediate 2 level (required of all BA candidates)

Note: For placement information on freshman English, college mathematics, or modern languages, students should consult the Office of the Dean, 400 Meserve Hall, or the appropriate department. Placement criteria are published in *The College of Arts and Sciences Guidebook*.

Students who plan to use Russian or Italian language study to satisfy the foreign language requirement should begin their program early because the college is not always able to offer these courses on a regular basis.

Category II Methods of Inquiry

Category III The Western Cultural Heritage

Category IV Alternative Cultures and Societies

Category V Theoretical Perspectives and Changes

Category VI Current Issues in Perspective

Note: Descriptions for all College of Arts and Sciences courses begin on page 55. Courses approved for the College's core curriculum have Roman numerals in parentheses at the end of the descriptions. Roman numerals indicate the appropriate core curriculum categories for each core course. Students are required to complete courses in each category of the core, depending upon the major and degree pursued. *The College of Arts and Sciences Guidebook*, available in the Office of the Dean, 400 Meserve Hall, provides a thorough description of the courses required in each category, as well as a list of courses that may be used to fulfill each requirement.

Middler Year Writing Requirement

The middler year writing requirement (MYWR) is a University requirement. The College of Arts and Sciences strongly recommends intermediate writing (ENG 1350) to complete the MYWR. Students may, however, also satisfy the requirement by completing a four-credit writing course from the approved MYWR list with a grade of C or better or, with special permission through the petition process, a one-credit writing workshop (ENG 1340). Students not participating in the cooperative education program complete the MYWR in their junior year.

College Honors Program

The College of Arts and Sciences Honors Program runs honors sections of some required or elective courses, as well as some interdisciplinary honors seminars and minicourses. Many of these courses are equivalent to standard courses in the college for satisfaction of degree requirements. The course number is designed to make this apparent. For example, an honors section of ECN 1115 will be numbered ECN 1715; PHL 1100 is PHL 1700. A full list of the offerings can be found in each quarter's booklet of course offerings, listed under the departments that offer the courses, and identified with a 1700 number.

For more information on honors courses, how to qualify to take courses, and other aspects of the program, contact the Honors Program Office at 617-437-2333 or drop by 213 Lake Hall.

Students should refer to *The College of Arts and Sciences Guidebook*, and any publications distributed by major departments for more specific information about the curriculum.

African-American Studies

Bachelor of Arts

Bachelor of Science

A major in African-American studies offers background for a range of professions calling for understanding of intergroup relations and the minority experience. Students may go on to graduate study in such areas as social work, sociology, education, law, business, history, or the humanities.

Students majoring in African-American studies may earn either the bachelor of arts (BA) or bachelor of science (BS) degree. All majors are required to take the following set of courses.

AFR 1127 African-American Literature
 AFR 1131 African-American History 1
 AFR 1161 Economic Issues in Minority Communities
 AFR 1171 Survey of Contemporary Black Political Movements
 AFR 1240 Contemporary Issues in Black Society
 AFR 1248 Race Relations in America
 AFR 1280 Black Psychological Identity
 AFR 1300 Directed Study
 AFR 1350 Research Seminar

In addition, complete the arts and sciences core curriculum (see page 2).

Faculty advisers work with students to help them select one or more "concentration clusters" (as described below) in African-American studies.

Minor in African-American Studies

A minor in African-American studies is designed to meet the needs of students who major in other areas but have special interest in African-American studies. To qualify for a minor, a student must earn 28 QH credits in the field, 12 of which must be from the set of courses required for majors. The remaining credits will be a concentration cluster arranged in consultation with a student's faculty adviser.

A concentration cluster is a set of four courses that focuses on an aspect of African-American studies. A cluster might focus on sociology-psychology, history, humanities, human service, research, or other areas related to the student's educational or career needs. Concentration clusters are arranged in consultations between the student and a faculty adviser.

Art and Architecture

Bachelor of Arts

Bachelor of Science

Major in art. ART 1100, History of Art to 1400, and ART 1101, History of Art since 1400; ART 1124, Basic Drawing; ART 1130, Visual Studies Foundation 1; ART 1131, Visual Studies Foundation 2; and twelve art electives.

In addition, complete the arts and sciences core curriculum (see page 2).

Architecture concentration. Leading to a BS degree that is not a professional degree in architecture. Same requirements as for the art major, except for the twelve art electives that are replaced by four

architectural history courses (ART 1111, Introduction to Architecture; ART 1203, Medieval Architecture; or ART 1204, Renaissance Architecture; ART 1225, Modern Architecture 1 and ART 1228, Modern Architecture 2); five architectural studio courses (Architectural Design 1 to 4 and Architectural Thesis 1); four building technology and management courses; and four math/science courses (MTH 1123, Calculus 1; MTH 1124, Calculus 2; PHY 1221, Physics for Engineering Students 1; PHY 1222, Physics for Engineering Students 2. To fulfill all requirements for the architecture concentration, students must begin required courses in the first year.

In addition, complete the arts and sciences core curriculum (see page 2).

Visual and media design concentration. Same requirements as for the art major, except for the twelve art electives that are replaced by: ART 1132, Graphic Design 1; ART 1134, Typography; ART 1139, Print Production; ART 1160, Introduction to Photography; ART 1180, Video Basics; ART 1190, Introduction to Computer Graphics; ART 1213, Modern Painting; ART 1240, History of Graphic Design; ART 1241, Advertising Design; ART 1243, Graphic Design 2; ART 1250, Color Theory and Practice; ART 1254, Intermediate Drawing; ART 1263, Introduction to Color Photography; ART 1280, Media Graphics; ART 1290, Electronic Publishing Design; ART 1291, Intermediate Computer Graphics Workshop; ART 1330, Advanced Visual Communication; SPC 1300, Introduction to Communication Theory; MGT 1115, Introduction to Business; and MKT 1435, Introduction to Marketing.

In addition, complete the arts and sciences core curriculum (see page 2).

Minor in Art

History of architecture. ART 1200, Ancient Architecture; ART 1203, Medieval Architecture; ART 1204, Renaissance Architecture; ART 1223, American Architecture; ART 1225, Modern Architecture 1; and ART 1228, Modern Architecture 2.

Studio art. ART 1124, Basic Drawing; ART 1127, Basic Painting; ART 1130, Visual Studies Foundation 1; ART 1132, Graphic Design 1; ART 1138, Introduction to Printmaking; and ART 1243, Graphic Design 2 or ART 1254, Intermediate Drawing.

Graphic design. ART 1130, Visual Studies Foundation 1; ART 1131, Visual Studies Foundation 2; ART 1132, Graphic Design 1; ART 1134, Typography; ART 1241, Advertising Design or ART 1243, Graphic Design 2; and ART 1250, Color Theory and Practice.

Photography. ART 1160, Introduction to Photography; ART 1261, Intermediate Black and White Photography; ART 1230, History of Photography; ART 1233, Contemporary Directions in Photography; ART 1263, Introduction to Color Photography; and ART 1363, Advanced Photography Seminar.

General minor. Selection of any six courses from the departmental curriculum.

Biology

Bachelor of Arts

BIO 1103, Principles of Biology 1; BIO 1104, Principles of Biology 2; BIO 1105, Principles of Biology 3; BIO 1211, Environmental and Population Biology; BIO 1260, Genetics and Developmental Biology; BIO 1261, Cell Physiology and Biochemistry; and four advanced biology electives approved by department Advisory Committee.

MTH 1106, MTH 1107, *or* Calculus (one year); PHY 1201, PHY 1202, Physics for the Life Sciences 1 and 2, PHY 1501, PHY 1502, Physics Lab for the Life Sciences 1 and 2; *or* PHY 1231, Physics for Science Majors 1; and PHY 1232, Physics for Science Majors 2, *or* PHY 1233, Physics for Science Majors 3; PHY 1531, PHY 1533, *or* PHY 1532, Physics Lab for Science Majors 1 and 2 *or* 3; CHM 1111, General Chemistry; CHM 1122, General Chemistry 2; CHM 1221, Analytical Chemistry; and CHM 1264, CHM 1265, Organic Chemistry 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 2).

Bachelor of Science

BIO 1103, Principles of Biology 1; BIO 1104, Principles of Biology 2; BIO 1105, Principles of Biology 3; BIO 1211, Environmental and Population Biology; BIO 1260, Genetics and Developmental Biology; BIO 1261, Cell Physiology and Biochemistry; BIO 1490, Senior Seminar; four advanced biology electives approved by department Advisory Committee.

Calculus (one year); PHY 1231, PHY 1232, PHY 1233, Physics for Science Majors 1, 2, and 3; PHY 1531, PHY 1532, Physics Lab for Science Majors 1 and 2; *or* PHY 1533, Physics Lab for Science Majors 3; CHM 1111, General Chemistry; CHM 1122, General Chemistry 2; CHM 1221, Analytical Chemistry; CHM 1264, CHM 1265, Organic Chemistry 1 and 2; and two additional advanced science electives approved by department Advisory Committee. Foreign language requirement.

In addition, complete the arts and sciences core curriculum (see page 2).

Chemistry

Bachelor of Arts

CHM 1151, CHM 1152, General Chemistry for Science Majors 1 and 2; CHM 1153, The Chemical Elements; CHM 1231, Analytical Chemistry for Chemistry Majors; CHM 1271, CHM 1272, CHM 1273, Organic Chemistry for Chemistry Majors and Chemical Engineering Students 1, 2, and 3; CHM 1381, CHM 1382, CHM 1383, Physical Chemistry 1, 2, and 3; CHM 1394, CHM 1395, CHM 1396, Experimental Physical Chemistry 1, 2, and 3; CHM 1422, Instrumental Methods of Analysis; and CHM 1432, Instrumental Analysis Lab.

In addition, complete the arts and sciences core curriculum (see page 2).

MTH 1143, MTH 1144, MTH 1145, Calculus 1, 2, and 3; MTH 1243, Calculus and Linear Methods 1 *or* MTH

1223, Calculus 4; PHY 1231, PHY 1232, PHY 1233, Physics for Science Majors 1, 2, and 3; and PHY 1532, PHY 1533, Physics Lab for Science Majors 2 and 3.

Bachelor of Science

CHM 1151, CHM 1152, General Chemistry for Science Majors 1 and 2; CHM 1153, The Chemical Elements; CHM 1231, Analytical Chemistry for Chemistry Majors; CHM 1271, CHM 1272, CHM 1273, Organic Chemistry for Chemistry Majors and Chemical Engineering Students 1, 2, and 3; CHM 1381, CHM 1382, CHM 1383, Physical Chemistry 1, 2, and 3; CHM 1394, CHM 1395, Experimental Physical Chemistry 1, 2, and 3; CHM 1422, Instrumental Methods of Analysis; CHM 1432, Instrumental Analysis Lab; CHM 1441, Inorganic Chemistry; CHM 1461, Identification of Organic Compounds; CHM 1811, Advanced Chemical Lab Practice 1; and two advanced science *or* mathematics electives.

MTH 1143, MTH 1144, MTH 1145, Calculus 1, 2, and 3; MTH 1243, Calculus and Linear Methods 1, *or* MTH 1223, Calculus 4. MTH 1245, Differential Equations and Linear Methods 1; *or* MTH 1225, Mathematical Analysis; PHY 1231, PHY 1232, PHY 1233, Physics for Science Majors 1, 2, and 3; and PHY 1532, PHY 1533, Physics Lab for Science Majors 2 and 3.

In addition, complete the arts and sciences core curriculum (see page 2).

Minor in Chemistry

After a general chemistry sequence, CHM 1231, Analytical Chemistry for Chemistry Majors; CHM 1271, CHM 1272, CHM 1273, Organic Chemistry 1, 2, and 3 for chemistry majors and chemical engineering students; CHM 1381, CHM 1382, Physical Chemistry 1 and 2; and CHM 1394, CHM 1395, Experimental Physical Chemistry 1 and 2.

Economics

Bachelor of Arts

ECN 1115, Principles of Macroeconomics; ECN 1116, Principles of Microeconomics; ECN 1250, ECN 1251, Statistics 1 and 2; ECN 1216, Microeconomic Theory; ECN 1215, Macroeconomic Theory; ECN 1337, History of Economic Thought; six economics electives.

MTH 1106, MTH 1107, Fundamentals of Mathematics 1 and 2; and four social science electives other than economics.

In addition, complete the arts and sciences core curriculum (see page 2).

Bachelor of Science

ECN 1115, Principles of Macroeconomics; ECN 1116, Principles of Microeconomics; ECN 1250, ECN 1251, Statistics 1 and 2; ECN 1216, Microeconomic Theory; ECN 1215, Macroeconomic Theory; ECN 1350, Introduction to Econometrics *or* ECN 1351, Problems in Economic Research; and ten economics electives.

MTH 1106, MTH 1107, Fundamentals of Mathematics 1 and 2; and four social science electives other than economics.

In addition, complete the arts and sciences core curriculum (see page 2).

Minor in Economics

ECN 1115, Principles of Macroeconomics; ECN 1116, Principles of Microeconomics; ECN 1216, Microeconomic Theory; ECN 1215, Macroeconomic Theory; and four electives in economics. Electives to be selected with the advice of a department adviser. Any course taken outside the Department of Economics to satisfy these economics elective requirements must be approved by a faculty adviser in the department.

English

Bachelor of Arts

ENG 1126, Backgrounds to English and American Literature; ENG 1120 and 1121, Survey of English Literature 1 and 2; ENG 1123 and 1124, Survey of American Literature 1 and 2; ENG 1307, Approaches to Literature; two period courses; three major figure courses (one must be Shakespeare); one language or writing course; one junior/senior seminar; and three electives in English.

In addition, complete the arts and sciences core curriculum (see page 2).

Bachelor of Science

ENG 1126, Backgrounds to English and American Literature; ENG 1120 and 1121, Survey of English Literature 1 and 2; ENG 1123 and 1124, Survey of American Literature 1 and 2; ENG 1307, Approaches to Literature; two period courses; three major figure courses (one must be Shakespeare); one language or writing course; one junior/senior seminar; and three electives in English.

In addition, complete the arts and sciences core curriculum (see page 2).

Minor in Literature

Six courses required. Two survey courses required from the following: ENG 1120, Survey of English Literature 1; ENG 1121, Survey of English Literature 2; ENG 1123, Survey of American Literature 1; ENG 1124, Survey of American Literature 2. One course from two of the following categories: (a) literary periods; (b) major figures; and (c) language and writing. One elective from (a), (b) or (c). A junior/senior seminar.

Minor in Writing

Six courses required, four from the following: ENG 1350, Intermediate Writing; ENG 1351, Creative Writing; ENG 1125, Technical Writing 1; ENG 1370, Technical Writing 2; ENG 1380, Writing for the Professions; Health Services; ENG 1352, Advanced Writing; ENG 1381, Writing for the Professions: Business Administration; ENG 1382, Writing for the Professions: Criminal Justice; ENG 1357, Poetry Workshop; ENG 1358, Fiction Workshop; ENG 1362, Publication Arts; ENG 1359, Nonfiction Workshop; and two electives chosen from the courses listed or literature courses.

Minor in Linguistics

See Interdisciplinary Minors.

Minor in Technical Communication

See Interdisciplinary Minors.

Geology

Bachelor of Arts in Geology

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1310, Descriptive Mineralogy; GEO 1308, Petrology; GEO 1440, Geomorphology; GEO 1418, Structural Geology; and five geology electives.

MTH 1106, MTH 1107, Fundamentals of Mathematics 1 and 2; *or* MTH 1107, MTH 1108, Calculus 1 and 2; PHY 1231, Physics for Science Majors; *or* PHY 1201, Physics for the Life Sciences 1; CHM 1111, General Chemistry 1; and CHM 1122, General Chemistry 2.

In addition, complete the arts and sciences core curriculum (see page 2).

Bachelor of Science in Geology

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1310, Descriptive Mineralogy; GEO 1311, Optical Crystallography; GEO 1308, Petrology; GEO 1418, Structural Geology; and eight geology electives.

MTH 1107, MTH 1108, Calculus 1 and 2, *or* MTH 1123, MTH 1124, MTH 1125, Calculus 1, 2, and 3; PHY 1231, PHY 1232, PHY 1233, Physics for Science Majors 1, 2, and 3; CHM 1111, CHM 1122; *or* CHM 1151, CHM 1152, General Chemistry 1 and 2; CHM 1231 *or* CHM 1221, Analytical Chemistry; *or* CHM 1391, Physical Chemistry; *or* GEO 1412, Geochemistry; and two approved additional science electives.

In addition, complete the arts and sciences core curriculum (see page 2).

Minor in Geology

GEO 1212, Physical Geology; GEO 1222, Historical Geology; GEO 1308, Petrology; GEO 1213, Physical Geology Lab; GEO 1223, Historical Geology Lab; plus four geology electives (GEO 1250 or higher number) chosen with the approval of the geology department.

Bachelor of Arts in Environmental Geology

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1308, Petrology; GEO 1440, Geomorphology; GEO 1438, Geology and Land-use Planning; and five geology electives.

MTH 1107, MTH 1108, Calculus 1 and 2, *or* MTH 1106, Fundamentals of Mathematics and MTH 1107, Functions and Basic Calculus; BIO 1103, BIO 1104, Principles of Biology 1 and 2; CHM 1111, CHM 1122, General Chemistry 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 2).

Bachelor of Science in Environmental Geology

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1308, Petrology; GEO 1440, Geomorphology; GEO 1310, Descriptive Mineralogy; GEO 1438, Geology and Land-use Planning; GEO 1442, Water in Environmental Planning; and eight geology electives.

MTH 1107, MTH 1108, Calculus 1 and 2; PHY 1231, PHY 1232, PHY 1233, Physics for Sciences Majors 1, 2, and 3, or BIO 1103, BIO 1104, BIO 1105, Principles of Biology 1, 2, and 3; CHM 1111, CHM 1122, General Chemistry 1 and 2; and CHM 1211, Analytical Chemistry, or GEO 1412, Geochemistry; and two approved additional science electives.

In addition, complete the arts and sciences core curriculum (see page 2).

Minor in Environmental Geology

GEO 1212, Physical Geology, or GEO 1140, Environmental Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1438, Geology and Land-use Planning; plus four geology electives (GEO 1250 or higher number) chosen with the approval of the geology department.

History**Bachelor of Arts**

HST 1101 and HST 1102, Western Civilization 1 and 2; HST 1201 and HST 1202, United States to 1877 and United States since 1877; HST 1241, The Historian's Craft; HST 1805, Approaches to History; nine history electives distributed as follows: two courses in Group A (ancient, medieval, early modern Europe); two courses in Group B (modern Europe); two courses in Group C (America); two courses in Group D (other regions); and one course in any of the above groups.

In addition, complete the arts and sciences core curriculum (see page 2).

Recommended: Courses in the related social sciences.

Bachelor of Science

HST 1101 and HST 1102, Western Civilization 1 and 2; HST 1201 and HST 1202, United States to 1877 and United States since 1877; HST 1241, The Historian's Craft; HST 1251, Social Science Methodology; HST 1805, Approaches to History; eleven history electives distributed as follows: two courses in Group A (ancient, medieval, and early modern Europe); two courses in Group B (modern Europe); two courses in Group C (America); two courses in Group D (other regions); and three courses in any of the above groups.

Either a social science minor that requires some theoretical or methodological courses; or a social science minor without theoretical or methodological courses (in which case students must take either PSY 1211, SOC 1320, or ECN 1250 or another acceptable

statistics course); or a coherent program in science and/or social science composed of six courses (in which case students should consult with an adviser and have the approval of the Undergraduate Committee in the Department of History); or a recognized minor in another college of the University (for example, Business Administration). A computer course approved by an adviser and, where applicable, a statistics course.

In addition, complete the arts and sciences core curriculum (see page 2).

Minor in History

Eight courses in history, two of which must be selected from the following: HST 1101, Western Civilization 1; HST 1102, Western Civilization 2; HST 1201, United States to 1877; and HST 1202, United States since 1877.

Human Services**Bachelor of Arts**

Prerequisite courses. SOC 1100, Introduction to Sociology, or ED 1100, Education and Social Science; ED 1302, The Human Services Professions; PSY 1111 and PSY 1112, Foundations of Psychology 1 and 2, or ED 1102 and ED 1103, Human Development and Learning 1 and 2; POL 1111, Introduction to American Government, or equivalent; ECN 1115 or ECN 1116, Principles of Macroeconomics, or Principles of Microeconomics, or equivalent.

Core courses. PSY 1211, Statistics in Behavioral Science 1, or SOC 1320, Introduction to Statistical Analysis, or ED 1307, Introduction to Educational Statistics; PSY 1511, Experimental Design in Psychology, or SOC 1321, Research Methods 1, or SOC 1324, Human Services Research and Evaluation; SOC 1240, Sociology of Human Services Organizations; PSY 1272, Personality 1; PSY 1373, Abnormal Psychology 1; CRS 1314, Introduction to Counseling; SPC 1338, Group Discussion, or SPC 1330, Interpersonal Communication 1, or ED 1317, Seminar in Group Process; CRS 1310, Intervention Strategies; and INT 1333, Senior Seminar.

Social and community issues. Three courses focused on subjects such as poverty and welfare, minority affairs, special needs populations, and other contemporary American social problems, chosen with the student's academic adviser.

Human services specialization. Five courses in a particular subfield of human services, chosen with the student's academic adviser.

Human services fieldwork. INT 1336, Field Experience in Human Services 1, and INT 1337, Field Experience in Human Services 2.

In addition, complete the arts and sciences core curriculum (see page 2).

Specialization in Deaf Studies

Prerequisite courses, core courses, and fieldwork courses follow the standard human services major.

Three social and community issues courses selected from the subjects suggested above and/or from the following specific alternatives. PSY 1271, or SOC 1135, Social Psychology; SOA 1135, Language and Culture; SOA 1101, Cultural Meaning, and Everyday Experience; ENG 1118, Introduction to Language and Linguistics; PSY 1263, Nonverbal Communication; SOC 1140, Sociology of Prejudice; SPC 1232, Female/Male Communication; and CRS 1314, Introduction to Counseling.

Deaf studies specialization. ASL 1101, American Sign Language 1; ASL 1102, American Sign Language 2; ASL 1201, Intermediate American Sign Language 1; ASL 1202, Intermediate American Sign Language 2; *and five courses selected from:* ASL 1211, Deaf Culture; ASL 1212, Deaf History; PSY 1363, American Sign Language Linguistics; PSY 1261, Bilingualism; SLA 1101, Introduction to Speech and Hearing; and ASL 1401, American Sign Language Literature.

Interdisciplinary Studies

Independent Major

An eligible student may petition the College Curriculum Committee to meet requirements for the BA degree in an independent major. Eligibility, procedures, and requirements must be discussed in advance with an adviser in the Office of the Dean, 400 Meserve Hall. No student may be considered for an independent major until a curriculum proposal has been submitted to, and approved by, the College Curriculum Committee.

Minor in Asian Studies

Whatever a student's major or interests, the minor in Asian Studies provides an important opportunity to augment knowledge of Asian culture, history, and politics. The minor program allows students to choose a concentration in Middle Eastern studies or East Asian studies (China, Japan, Korea). Courses cover a range of academic disciplines: anthropology, history, music, philosophy and religion, sociology, language, and political science. In each concentration, three core courses and four electives are required.

Middle Eastern studies concentration. Core courses: HST 1612, The Modern Middle East; PHL 1280, Islam; and POL 1345, Government and Politics in the Middle East. Choose four electives: ECN 1332, Economic History of Less Developed Countries; HST 1614, The Middle East Today; MUS 1182, Music of the Middle East; POL 1384, Arab-Israeli Conflict; and SOC 1310, Class, Power, and Social Change.

East Asian studies concentration. Core courses: PHL 1275, Eastern Religions; POL 1371, Government and Politics of China; and SOC 1104, Contemporary Japanese Culture and Society. Choose four electives: HST 1150, Introduction to Third World History; HST 1591, China and the United States; HST 1592, History of the Vietnam War; HST 1633, Modern China; HST 1634, Communist China; HST 1637, Modern Japan; POL 1332, Government and Politics of Japan; HST

1641, Recent Leaders of Asia; PHL 1130, Ethics: East and West; PHL 1255, Indian Philosophy; PHL 1250, Chinese Philosophy; PHL 1293, Mysticism: East and West; and POL 1372, China's Foreign Relations.

For both concentrations, it is strongly recommended that students pursue language training to gain proficiency in an Asian language. Chinese courses are currently taught in the Basic College program.

Minor in Cinema Studies

The minor in cinema studies permits students to acquire skills in the analysis of one of the major art forms and cultural influences of the twentieth century and to gain critical tools that can be used to study the relationships between film and society, history, aesthetics, performance, philosophy, and psychoanalysis. Students take eight courses, including two required courses, a filmmaking requirement, and five electives. Due to their interdisciplinary nature, many courses are listed in several departments.

Required courses. LNF 1550, Introductory Film Analysis; and LNF 1551, Film Theory.

Filmmaking requirement. One of the following: ART 1170, Filmmaking Workshop; ART 1171, Animation Workshop; ART 1180, Video Basics; or SPC 1450, Television 1.

Electives. ART 1233, Contemporary Directions in Cinema; ART 1235, History of Film; ART 1236, The American Film; ART 1238, Documentary Film; ART 1280, Media Graphics; ART 1281, Video Project; DRA 1316, Acting for the Camera; ENG 1288, Film and Text; ENG 1289, Shakespeare on Film; ENG 1290, Topics in Film (may not be counted more than twice); ENG 1291, Popular Culture; ENG 1294, Modern Film; ENG 1296, American Film and Society; ENG 1297, Approaches to Film; HST 1494, History and Film; HST 1575, History of Media in America; INT 1320, Exploring the Humanities through Film; INT 1321, Modernism; LNF 1521, French Film Masterpieces; LNF 1560, Film and Psychoanalysis; LNS 1550, Spanish Film Masterpieces; MUS 1139, Film Music; SOA 1120, Camera on Culture: Visual Anthropology; SPC 1454, Programming for Radio and Television, SPC 1455, Television 2; SPC 1554, Special Topics in Broadcasting (when appropriate).

For more information, contact the film studies coordinator, Professor Inez Hedges (320 Ryder Hall), at 617-437-5163.

Minor in Linguistics

A total of six courses is required. ENG 1118, Introduction to Language and Linguistics. Choose one course from: ENG 1401, Introduction to Syntax; PSY 1262, Language and Cognition; and PSY 1361, Introduction to Phonetics. Choose four courses from: ENG 1119, History of the English Language; *ENG 1401, Introduction to Syntax; ENG 1402, Grammars of English; ENG 1407, Introduction to Semantics; ENG 1408, Topics in Linguistics; ENG 1690, Junior/Senior Seminar (in Linguistics or Stylistics); LNL 1235 Applied Linguistics; LNL 1236, Applied Linguistics 2; PHL 1215, Symbolic Logic; PHL 1440, Philosophy

of Language; PSY 1261, Bilingualism; *PSY 1262, Language and Cognition; PSY 1263, Non-verbal Communication; *PSY 1361, Introduction to Phonetics; PSY 1362, Child Language; PSY 1363, Linguistics of American Sign Language; PSY 1364 Cognition; PSY 1365, Language and the Brain; PSY 1562, Laboratory in Psycholinguistics; PSY 1661, Seminar in Psycholinguistics; PSY 1662, Seminar in Cognition; and SOA 1135, Language and Culture.

*If not already taken.

Minor in Marine Studies

The marine studies minor provides a program of study in the multidisciplinary aspects of the marine environment. The program emphasizes either the scientific or social science/humanistic study of the oceans.

At least six marine-related courses totaling 24 QH are required. Two courses must be beyond the introductory level, and at least one course must be from the natural sciences and one from the social sciences/humanities.

Mastery of a marine-related skill such as scuba diving, piloting and navigation, or sailing is required. This can be achieved through coursework of an approved outside certification. Coursework in marine skills is normally limited to one of the six required courses.

A project involving some degree of independent study of a marine-related topic must be completed. This can be accomplished by a directed studies course in marine studies, or, with approval, by completion of a major course-related project or outside project.

For more information, contact Professor Peter Rosen, marine studies coordinator, at 617-437-3176.

Minor in Media Studies

To qualify for a minor in media studies, the student must complete a minimum of eight courses as follows. Three required courses: SPC 1250, Introduction to Mass Communication; HST 1575, History of Media in America; and SPC 1300, Introduction to Communication Theory or SPC 1317, Theories of Audience Behavior; or INT 1320, Exploring Humanities through Film; and five elective courses from the two categories media production and media application (at least two electives in each category). Individual student programs will be developed in consultation with faculty advisers. Students should contact Dr. Zaremba (Department of Speech Communication) for information on program development and elective choices.

Minor in Technical Communication

Technical communication combines written, oral, and graphics skills with a background in science or technology. The minor in technical communication gives students the opportunity to prepare themselves for careers as technical writers, or for careers in which technical communication is a significant part of their jobs. Students in English or other liberal arts

studies may elect the minor, as may students from a variety of technological or scientific fields. A student does not have to be enrolled in the College of Arts and Sciences to declare the minor.

Eight courses are required. Students must choose courses from the following areas.

Writing Courses

ENG 1125 Technical Communication 1 (Required)

Choose two of the following.

ENG 1352 Advanced Writing

ENG 1370 Technical Writing 2

ENG 1371 Writing for the Computer Industry

ENG 1380 Writing for the Professions:

Health Services

ENG 1381 Writing for the Professions:

Business Administration

One of these courses must be ENG 1370 or 1371.

Speech Communication Courses

Choose one.

SPC 1116 Business and Professional Speaking

SPC 1331 Interpersonal Communication 2

Graphic Arts Courses

JRN 1440 Design and Graphics You may take an equivalent in another department or college.

Computer Programming

COM 1101 Introduction to Computers 1 (Required)

Computer Science and Science Courses

Choose two courses, preferably both within the same discipline.

BIO 1130 General Biology

BIO 1131 Animal Biology

CHM 1111 General Chemistry

CHM 1112 General Chemistry

GE 1106 FORTRAN Programming

GEO 1212 Physical Geology

GEO 1213 Historical Geology

IIS 1125 COBOL Programming 1

PHY 1231 Physics for Science Majors 1

PHY 1232 Physics for Science Majors 2

PHY 1233 Physics for Science Majors 3

Minor in Urban Studies

Students must take 28 QH (seven courses). *Required courses (three):* SOC 1147, Urban Society; POL 1324, Urban Politics; ECN 1320, Urban Economics. One course from each of the following four areas: *Urban Problems and Policies* (SOC 1346, Suburb and Metropolis; POL 1318, State and Local Government; ECN 1321, Urban Economic Problems and Policies), *Urban Humanities* (HST 1391, European Urban History to 1850; HST 1543, American Urban History; ENG 1608, The City in Literature), *Urban Form and Design* (ART 1113, Architecture and the City; ART 1225, Technology, Architecture, and the City; ART 1150, Introduction to Architectural Design), and *African-American Studies* (AFR 1261, Economics of Urban Poverty; AFR 1275, Urban Political Issues; AFR 1475, Public Policy Analysis).

To obtain credit for the minor, students must file a petition form with the College of Arts and Sciences. Interested students should confer with an adviser as soon as possible. Advisers are: Professor Robert Gilbert, political science, 303 Meserve Hall, 617-437-2796; Professor Clay McShane, history, 249 Meserve Hall, 617-437-2660; Professor Peter Serenyi, art and architecture, 239 Ryder Hall, 617-437-2347; Professor Gregory Wassall, economics, 317 Lake Hall, 617-437-2196.

Minor in Women's Studies

Students take a total of nine courses: four required interdisciplinary courses and five electives.

Required interdisciplinary courses. HST 1490/INT 1150 Introduction to Women's Studies; SOC 1302/INT 1302 Female Perspectives on Society; INT 1151, Seminar in Research 1; and INT 1152, Seminar in Research 2.

Elective Courses. AFR 1241, Black Family; AFR 1480, Black Man/Black Woman; BIO 1187, Biology of Human Reproduction; CJ 1616, Women and the Criminal Justice System; ECN 1312, Women in the Labor Market; ENG 1551, Gender Roles in Literature; ENG 1600, Topics in Literature; ENG 1602, Major Figure; other literature courses when gender-oriented; HST 1392, Women in European History to 1815; HST 1472, The Family in European History; HST 1473, Women in Modern Europe; HST 1554, Women in America; HST 1644, Third World Women; LNF 1560, Film and Psychoanalysis; LNS 1510, Saints and Sinners; MUS 1106, Women in Music; MUS 1800, Directed Study; NUR 1303, Life Crisis: Analysis and Response; PHL 1295, Medicine, Religion, and the Healer's Art; POL 1316, Contemporary Revolutionary Politics; POL 1327, Sex Roles in American Politics; POL 1328, Women in Public Management; PSY 1218, Psychology of Women; SOA 1160, Sex, Sex Roles, and the Family; SOA 1301, Human Origins; SOA 1303, Sexuality and Culture; SOC 1155, Sociology of the Family; SOC 1160, Sex-Gender Roles in a Changing Society; SOC 1177, Social Roles in the Business World; SOC 1178, Women Working; SOC 1217, Women, Health, and Social Change; and SPC 1232, Female/Male Communication.

Graduate courses offered as electives. English: Topics in Literature courses accepted when focused on women; HST 3370, Seminar in History of the Family; HST 3399, Seminar in Approaches to Women's History; POL 3665, Women in Public Management; POL 3667, Equal Opportunity in Public Administration; POL 3668, Legal Issues in Public Personnel Administration; SOA 3102, Class and State Formation; SOA 3156, Gender, Kinship, and Social Change; SOC 3155, The Family; SOC 3160, Women, Men, and Social Change; SOC 3175, Sociology of Work; SOC 3304, Feminist Theory; and SOC 3410, Contemporary Issues in Sociology.

These courses represent the most current listing. New courses are continually being developed and added to the program. For more information and the

most recent brochure describing the Women's Studies Program, contact Professor Laura Frader at 617-437-4442.

Journalism

Bachelor of Arts Bachelor of Science

Each major will complete the journalism core and one of four concentrations—newspaper/print, radio-television news, advertising, or public relations—to correspond with his/her career objective.

Journalism core. JRN 1501, History of Journalism; JRN 1512, Journalism, Ethics and Issues; JRN 1103, Newswriting 1; JRN 1104, Newswriting 2; JRN 1206, Editing; JRN 1508, Law of the Press; and JRN 1301, Photojournalism.

Newspaper/print concentration. JRN 1305, Techniques of Journalism; JRN 1432, Local Government Reporting; JRN 1440, Design and Graphics; JRN 1575, Publication Production and Management; and one journalism elective.

Radio-television news concentration. JRN 1320, Radio News Gathering and Writing; JRN 1421, Television Newswriting; JRN 1422, Television News Production; JRN 1894, Directed Study; and one journalism elective.

Public relations concentration. JRN 1336, Public Relations Principles; JRN 1440, Design and Graphics; JRN 1460, Public Relations Problems; JRN 1561, Public Relations Practice; and one journalism elective.

Advertising concentration. JRN 1440, Design and Graphics; JRN 1350, Advertising Principles; JRN 1451, Advertising Copy Writing; JRN 1552, Advertising Practice; and one journalism elective.

Each major will complete the following related requirements.

ENG 1275, Grammar for Journalists; ENG 1110, Freshman English 1; ENG 1111, English 2. One course from this list: ENG 1120, Survey of English Literature 1; ENG 1121, Survey of English Literature 2; ENG 1123, Survey of American Literature 1; ENG 1124, Survey of American Literature 2; and one additional English or American literature elective.

POL 1310, American Ideology; POL 1318, State and Local Government; HST 1201, United States to 1877; HST 1202, United States since 1877; ECN 1115, Principles of Macroeconomics; and one additional course in economics or business; MTH 1152 Statistical Thinking; PHL 1200, Introduction to Logic 1; PHL 1140, Social and Political Philosophy; two history electives; and COP 1135, Professional Development for Journalists.

MUS 1109, Introduction to Art, Drama, and Music or one course from each of the following categories—(a): ART 1106, Introduction to Art; ART 1220, American Sculpture and Painting; (b): MUS 1100, Music 1; MUS 1101, Music as a Listening Experience.

Bachelor of Arts

In addition to the journalism and related requirements above, candidates for the bachelor of arts degree will complete three courses in science and/or math.

Students must also complete the arts and sciences core curriculum (see page 2).

Bachelor of Science

In addition to the journalism and related requirements above, candidates for the bachelor of science degree will complete six courses in sciences and/or math.

Students must also complete the arts and sciences core curriculum (see page 2).

Linguistics

Bachelor of Arts

General requirements. ENG 1118, Introduction to Language and Linguistics; PSY 1262, Language and Cognition; PSY 1361, Introduction to Phonetics; SOA 1135, Language and Culture; ENG 1401, Introduction to Syntax; and PHL 1215, Symbolic Logic.

Second Language Requirement. Proficiency through Intermediate 2 level plus two advanced courses. The college language placement procedures determine proficiency in a spoken second language (see bachelor of science for proficiency in American Sign Language).

Additional courses. Five courses from the following: PSY 1261, Bilingualism; PSY 1362, Child Language; PSY 1363, Linguistics of American Sign Language; PSY 1364, Cognition; PSY 1365, Language and the Brain; PSY 1264, Animal Communication; PSY 1263, Nonverbal Communication; PHL 1440, Philosophy of Language; ENG 1119, History of the English Language; ENG 1402, Grammars of English; ENG 1407, Introduction to Semantics; ENG 1408, Topics in Linguistics; LNL 1235, Applied Linguistics; and LNL 1236, Advanced Applied Linguistics.

Lab course. PSY 1562, Laboratory in Psycholinguistics.

Seminar. Two from the following: ENG 1690, ENG 1691, Junior, Senior Seminar (linguistics, stylistics); PSY 1661, Seminar in Psycholinguistics; or PSY 1661, Seminar in Cognition.

Practicum. One course in fieldwork, directed study, sign language teaching, or interpreting.

In addition, complete the arts and sciences core curriculum (see page 2).

Bachelor of Science

Same requirement as the bachelor of arts, except that American sign language can count toward the second-language proficiency requirement.

In addition, complete the arts and sciences core curriculum (see page 2).

Mathematics

Bachelor of Arts

MTH 1143, MTH 1144, MTH 1145, Calculus 1, 2, and 3; MTH 1243, MTH 1244, Calculus and Linear Methods 1 and 2; MTH 1245, MTH 1246, Differential Equations and Linear Methods 1 and 2; MTH 1238, Combinatorial Mathematics; MTH 1301, Linear Algebra; MTH 1311, Analysis 1; and three approved mathematics electives selected in consultation with an adviser.

PHY 1231, PHY 1232, PHY 1233, Physics for Science Majors 1, 2, and 3.

In addition, complete the arts and sciences core curriculum (see page 2).

Bachelor of Science

MTH 1143, MTH 1144, MTH 1145, Calculus 1, 2, and 3; MTH 1243, MTH 1244, Calculus and Linear Methods 1 and 2; MTH 1245, MTH 1246, Differential Equations and Linear Methods 1 and 2; MTH 1238, Combinatorial Mathematics; MTH 1301, Linear Algebra; MTH 1311, Analysis 1; and six approved mathematics electives selected in consultation with an adviser.

PHY 1231, PHY 1232, PHY 1233, Physics for Science Majors 1, 2, and 3.

In addition, complete the arts and sciences core curriculum (see page 2).

Modern Languages

Bachelor of Arts

Eight advanced electives in the major language,* and two advanced electives in the minor language.*

ENG 1120, ENG 1121, Survey of English Literature 1 and 2; and four history electives.

In addition, complete the arts and sciences core curriculum (see page 2).

Bachelor of Science

The bachelor of science program is offered in Spanish and French. The requirement is twelve advanced electives in the major language, including two conversation and composition courses; six advanced electives in the minor language,* including two conversation and composition courses; two history electives.

In addition, complete the arts and sciences core curriculum (see page 2).

Minor in Modern Language

The Department of Modern Languages also offers a minor program for students whose major lies in other disciplines. The general requirement is *six* advanced courses (beyond the 1104 level) in the language. Interested students should consult with Professor Modée, 617-437-2237, about specific course requirements.

Minor in Russian Studies

Language proficiency. Students must demonstrate proficiency in Russian language by either completing

*Courses beyond the intermediate level.

LNR 1104, Intermediate Russian 2, or by passing the Russian language proficiency exam.

Nine courses are required including four courses in Russian language and literature. If necessary, the following courses may be used to attain required proficiency in the Russian language: LNR 1101, Elementary Russian 1; LNR 1102, Elementary Russian 2; LNR 1103, Intermediate Russian 1; LNR 1104, Intermediate Russian 2; LNR 1201, Russian Composition and Conversation 1; LNR 1202, Russian Composition and Conversation 2; LNR 1203, Advanced Russian Proficiency 1; LNR 1204, Advanced Russian Proficiency 2; LNR 1500, Russian Culture; LNR 1511, Russian Literature Translation; LNR 1801, Directed Study; or LNR 1802, Directed Study.

Two courses in Russian and Soviet history and culture from the following: HST 1451, Imperial Russia; HST 1452, Soviet Russia; or LNR 1500, Russian Culture. Two courses in political science from the following: POL 1347, Soviet Government; POL 1348, Soviet Foreign Policy; or a graduate course where permitted by the instructor. One additional course in any of the above categories or any other course or directed study approved by the minor adviser.

Interested students should consult the Department of Modern Languages, 617-437-2234.

Music

Bachelor of Arts

Concentration in music literature. MUS 1107, Principles of Music Literature; MUS 1201, Theory 1; MUS 1202, Theory 2; MUS 1203, Theory 3; MUS 1204, Theory 4; MUS 1301, Form and Analysis 1; MUS 1302, Form and Analysis 2; MUS 1209, Functional Piano; MUS 1121, Medieval and Renaissance Music; MUS 1122, Music of the Baroque Era; MUS 1123, Music of the Classical Era; MUS 1124, Music of the Romantic Era; MUS 1125, Twentieth-Century Music; ART 1106, Introduction to Art; DRA 1100, Introduction to Theatre Arts; and four approved music electives.

Ensembles: Students must participate in at least one Northeastern University performing ensemble during at least eight of their quarters on campus.

In addition, complete the arts and sciences core curriculum (see page 2).

Concentration in music literature and performance. MUS 1107, Principles of the Music Literature; MUS 1201, Theory 1; MUS 1202, Theory 2; MUS 1203, Theory 3; MUS 1204, Theory 4; MUS 1301, Form and Analysis 1; MUS 1209, Functional Piano; MUS 1122, Music of the Baroque Era; MUS 1123, Music of the Classical Era; MUS 1124, Music of the Romantic Era; MUS 1125, Twentieth-Century Music; MUS 1461, Applied Music Lessons (taken six times); ART 1106, Introduction to Art; DRA 1100, Introduction to Theatre Arts; and three approved music electives.

Ensembles: Students must participate in at least one Northeastern University performing ensemble during at least eight of their quarters on campus.

In addition, complete the arts and sciences core curriculum (see page 2).

Concentration in music industry. MUS 1107, Principles of Music Literature; MUS 1201, Theory 1; MUS 1202, Theory 2; MUS 1203, Theory 3; MUS 1209, Functional Piano; MUS 1165, Music Industry 1; MUS 1166, Music Industry 2; MUS 1167, Music Administration; MU 1170, Music and Technology; MUS 1365, Seminar: Topics in Music Industry; MUS 1172, The Recording Studio; ECN 1115, Principles of Macroeconomics; ECN 1116, Principles of Microeconomics; MGT 1115, Introduction to Business; ACC 1210, Introduction to Accounting; FIN 1438, Introduction to Finance; MKT 1435, Introduction to Marketing; HRM 1432, Organizational Behavior; SPC 1452, Radio 1; ART 1106, Introduction to Art or DRA 1100, Introduction to Theatre Arts; descriptive or inferential statistics (MTH 1387 and 1390 or ECN 1250 and 1251 or POL 1301 and 1302); MSC 1441, Operations Management or ENT 1330, Management of Smaller Enterprises; and three approved music electives.

Ensembles: Students must participate in at least one Northeastern University performing ensemble during at least four of their quarters on campus.

In addition, complete the arts and sciences core curriculum (see page 2).

Bachelor of Science

Concentration in music industry. MUS 1107, Principles of Music Literature; MUS 1201, Music Theory 1; MUS 1202, Music Theory 2; MUS 1203, Music Theory 3; MUS 1209, Functional Piano; MUS 1225, Music of the Twentieth Century. Any two of the following four courses: MUS 1121, Medieval and Renaissance Music; MUS 1222, Music of the Baroque Era; MUS 1223, Music of the Classical Era; MUS 1224, Music of the Romantic Era. MUS 1180, Introduction to World Music or one other approved course in non-Western music. MUS 1165, Music Industry 1; MUS 1166, Music Industry 2; MUS 1167, Music Administration; MUS 1170, Music and Technology; MUS 1172, The Recording Studio; MUS 1365, Seminar: Topics in Music Industry; ECN 1115, Principles of Macroeconomics; ECN 1116, Principles of Microeconomics. Two of the following three pairs of courses in descriptive and inferential statistics: MTH 1387 and 1390; ECN 1250 and 1251; POL 1301 and 1302; MGT 1115, Introduction to Business; ACC 1210, Introduction to Accounting; FIN 1438, Introduction to Finance; MKT 1435, Introduction to Marketing; HRM 1432, Organizational Behavior. One of the following: MSC 1441, Operations Management; ENG 1330, Management of Smaller Enterprises; HST 1102, Western Civilization 2; SPC 1452, Radio 1. One of the following: ART 1106, Introduction to Art (or another approved art course); DRA 1100, Introduction to Theatre Arts (or another approved course in theatre).

Ensembles: Students must participate in at least one Northeastern University performing ensemble during at least four of their quarters on campus.

In addition, complete the arts and sciences core curriculum (see page 2).

Minor in Music

MUS 1201, MUS 1202, MUS 1203, Theory 1, 2, and 3; MUS 1241, Piano Class 1; MUS 1120, Survey of Music History; one approved music elective; any *one* of the following courses: MUS 1121, Medieval and Renaissance Music; MUS 1122, Music of the Baroque Era; MUS 1123, Music of the Classical Era; MUS 1124, Music of the Romantic Era; or MUS 1125, Music of the Twentieth Century.

Philosophy

Bachelor of Arts

Bachelor of Science

PHL 1225, Ancient Philosophy; PHL 1230, Modern Philosophy; PHL 1200, Introduction to Logic 1; *or* PHL 1215, Symbolic Logic; PHL 1400, Theory of Knowledge; *or* PHL 1405, Metaphysics; *or* PHL 1335, Moral Philosophy; one philosophy seminar; and eight philosophy electives.

In addition, complete the arts and sciences core curriculum (see page 2).

Minor in Philosophy

To qualify for a minor in philosophy, a student must take 28 QH in philosophy to be distributed as follows.

Introductory courses. PHL 1100, Introduction to Philosophy 1; *or* PHL 1105, Introduction to Scientific Method; *History of philosophy.* PHL 1225, Ancient Philosophy; *or* PHL 1230, Modern Philosophy. *Logic requirement.* PHL 1200, Introduction to Logic 1; *or* PHL 1215, Symbolic Logic. At least one of the following courses: PHL 1142, Philosophy of Mind; PHL 1400, Theory of Knowledge; and PHL 1405, Metaphysics; PHL 1335, Moral Philosophy.

Electives. Three electives; and three electives in philosophy.

Physics

Bachelor of Arts

PHY 1231, PHY 1232, PHY 1233, Physics for Science Majors 1, 2, and 3, and associated labs—PHY 1531, PHY 1532, PHY 1533; PHY 1301, Intermediate Mechanics; PHY 1302, Electric and Magnetic Fields; three upper-level physics lecture courses, and three upper-level lab courses.

MTH 1143, MTH 1144, MTH 1145, Calculus 1, 2, and 3; MTH 1243, MTH 1244, Calculus and Linear Methods 1 and 2; and one advanced mathematics elective.

In addition, complete the arts and sciences core curriculum (see page 2).

Bachelor of Science

PHY 1231, PHY 1232, PHY 1233, Physics for Science Majors 1, 2, and 3, and associated labs—PHY 1531, PHY 1532, PHY 1533; PHY 1301, Intermediate Mechanics; PHY 1302, Electric and Magnetic Fields; PHY 1303, Modern Physics; PHY 1304, Mathematical Physics; PHY 1305, Thermodynamics and Kinetic

Theory; PHY 1401, Classical Mechanics; PHY 1402, PHY 1403, Electricity and Magnetism 1 and 2; PHY 1404, Wave Motion and Optics; and three upper-level lab courses.

MTH 1143, MTH 1144, MTH 1145, Calculus 1, 2, and 3; MTH 1243, MTH 1244, Calculus and Linear Methods 1 and 2; MTH 1245, MTH 1246, Differential Equations and Linear Methods 1 and 2; and five additional electives from those approved for majors in the following fields: physics, mathematics, computer science, chemistry, engineering, biology, and geology.

In addition, complete the arts and sciences core curriculum (see page 2).

Bachelor of Science in Applied Physics

PHY 1231, PHY 1232, PHY 1233, Physics for Science Majors 1, 2, and 3, and associated labs—PHY 1531, PHY 1532, PHY 1533; PHY 1301, Intermediate Mechanics; PHY 1302, Electric and Magnetic Fields; PHY 1303, Modern Physics; PHY 1305, Thermodynamics and Kinetic Theory; PHY 1404, Wave Motion and Optics; PHY 1551 and PHY 1552, Electronics for Scientists 1 and 2; PHY 1555, Wave Lab; PHY 1557, Advanced Lab; and PHY 1561, Project Lab.

MTH 1143, MTH 1144, MTH 1145, Calculus 1, 2, and 3; MTH 1243, MTH 1244, Calculus and Linear Methods 1 and 2; MTH 1245, MTH 1246, Differential Equations 1 and 2.

COM 1100, COM 1101, Pascal 1 and 2; COM 1201, Data Structures. Four additional electives from those approved for majors in the following fields: physics, mathematics, chemistry, computer science, engineering, biology, and geology.

In addition, complete the arts and sciences core curriculum (see page 2).

Minor in Physics

PHY 1231, PHY 1232, PHY 1233, Physics for Science Majors 1, 2, and 3 *or* PHY 1221, PHY 1222, PHY 1223, PHY 1224, Physics for Engineering Students 1, 2, 3, and 4; *and* three upper-level lecture or lab courses from the following list: PHY 1301, PHY 1302, PHY 1303, PHY 1304, PHY 1305, PHY 1401, PHY 1402, PHY 1403, PHY 1404, PHY 1411, PHY 1412, PHY 1413, PHY 1414, PHY 1415, PHY 1416, PHY 1551, PHY 1552, and PHY 1555.

Instrumentation for Science Major

PHY 1231, PHY 1232, PHY 1233, Physics for Science Majors 1, 2, and 3; *or* PHY 1221, PHY 1222, PHY 1223, Physics for Engineering Students 1, 2, and 3.

PHY 1555, Wave Lab; PHY 1551, PHY 1552, Electronics for Scientists 1 and 2; and PHY 1557, Advanced Lab.

Political Science

Bachelor of Arts

POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments and Societies;

POL 1261, Public Administration; one political theory/thought course selected from the following: POL 1370, POL 1373, POL 1374; and seven political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 2).

Bachelor of Science

POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments and Societies; POL 1261, Public Administration; POL 1301, Research Methods 1; POL 1302, Research Methods 2; and one political theory/thought course selected from the following: POL 1370, POL 1373, POL 1374; and six political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 2).

Concentration in Law and Legal Issues

Bachelor of Arts

POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1261, Public Administration; POL 1373, Pre-Modern Political Thought or POL 1374, Modern Political Thought; six law-related electives; and four general political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 2).

Bachelor of Science

POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1261, Public Administration; POL 1301, Research Methods 1; POL 1302, Research Methods 2; POL 1373, Pre-Modern Political Thought or POL 1374, Modern Political Thought; six law-related electives; and two general political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 2).

Concentration in Public Administration

Bachelor of Science

POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1261, Public Administration; POL 1301, Research Methods 1; POL 1302, Research Methods 2; POL 1373, Pre-Modern Political Thought or POL 1374, Modern Political Thought; six law-related electives; and two general political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology, (consult political science department's approved psychology course list) and sociology.

In addition, complete the arts and sciences core curriculum (see page 2).

Minor in Political Science

Any two of the following courses: POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments and Societies; POL 1261, Public Administration. Any five additional courses offered by the Department of Political Science for political science majors, including courses listed above that have not been selected to fulfill the above requirement.

Minor in International Politics

POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments and Societies; any five additional courses in international politics and/or comparative politics offered by the Department of Political Science.

Psychology

Bachelor of Arts and Bachelor of Science

Psychology courses (basic courses). PSY 1110, Perspectives in Psychology 1 or PSY 1111, Foundations of Psychology 1; and PSY 1112, Foundations of Psychology 2 or PSY 1113, Perspectives in Psychology 2; PSY 1211 and PSY 1212, Statistics in Behavioral Science 1 and 2.

Specialty courses. Students choose two courses from the following: PSY 1271, Social Psychology; PSY 1272, Personality 1 or PSY 1373, Abnormal Psychology 1; and PSY 1241, Human Behavioral Development 1. Students also choose three courses from the following: PSY 1262, Language and Cognition; PSY 1231, Learning and Motivation; PSY 1351, Neuropsychology; and PSY 1381, Sensation or PSY 1382, Perception for bachelor of arts or bachelor of science degrees below.

Within the psychology department, students may concentrate their electives in a variety of subareas, including: language and cognition; learning and motivation; personality and social psychology; sensory

and neuropsychology; or individual study. Students should see a department adviser regarding these concentrations.

Additional Requirements for Bachelor of Arts

Four psychology electives; *either* three psychology labs and one psychology directed study *or* one psychology seminar; *or* two psychology labs, one psychology directed study, and one psychology seminar. Complete the arts and sciences core curriculum (see page 2).

Additional Requirements for Bachelor of Science

Seven psychology electives; *either* four psychology labs *or* three psychology labs and one psychology directed study; one psychology seminar.

Four mathematics, science, or computer science courses beyond the core curriculum requirements. Also, one humanities course beyond the core curriculum requirements. Complete the arts and sciences core curriculum (see page 2).

Minor in Psychology

Psychology courses (basic courses). PSY 1110, Perspectives in Psychology 1 or PSY 1111, Foundations of Psychology 1; and PSY 1112, Foundations of Psychology 2 *or* PSY 1113, Perspectives in Psychology 2; and PSY 1211 and PSY 1212, Statistics in Behavioral Science 1 and 2.

Specialty courses. Students choose two courses from the following: PSY 1271, Social Psychology; PSY 1272, Personality 1 *or* PSY 1373, Abnormal Psychology 1; PSY 1241, Human Behavioral Development 1; PSY 1262, Language and Cognition; PSY 1231, Learning and Motivation; PSY 1351, Neuropsychology; and PSY 1381, Sensation *or* PSY 1382, Perception.

Students also must take three other psychology courses and one psychology lab.

Sociology-Anthropology Concentration in Sociology

Bachelor of Arts

Preparatory requirements. SOC 1100, Introduction to Sociology; and SOA 1100, Peoples and Cultures; *Core requirements.* SOC 1320, Introduction to Statistical Analysis; SOC 1321, SOC 1322, Research Methods 1 and 2; SOC 1300, Classical Social Thought; SOC 1301, Current Social Thought; SOC 1310, Class, Power, and Social Change. *Elective requirements.* Two intermediate courses (1100 or 1200 level); two advanced courses (1300, 1400, or 1500 level); and one anthropology course beyond SOA 1100.

Six electives in the social sciences other than sociology/anthropology.

In addition, complete the arts and sciences core curriculum (see page 2).

Bachelor of Science

Preparatory requirements. SOC 1100, Introduction to Sociology and SOA 1100, Peoples and Cultures; *Core requirements.* SOC 1320, Introduction to Statistical Analysis; SOC 1321, SOC 1322, Research Meth-

ods 1 and II; SOC 1300, Classical Social Thought; SOC 1301, Current Social Thought; SOC 1310, Class, Power, and Social Change. *Elective requirements.* Two intermediate courses (1100 or 1200 level); two advanced courses (1300, 1400, or 1500 level); and one anthropology course beyond SOA 1100.

Six electives in the social sciences other than sociology/anthropology. Approved six-course specialization.

In addition, complete the arts and sciences core curriculum (see page 2).

Minor in Sociology

Requirements. SOC 1100, Introduction to Sociology; any two courses from among the following: SOC 1321, Research Methods 1; SOC 1322, Research Methods 2; SOC 1300, Classical Social Thought; SOC 1301, Current Social Thought; any three-course specialization in sociology arranged between the student and adviser; and one additional 1300, 1400, or 1500 level course.

Concentration in Anthropology

Bachelor of Arts

Preparatory requirements. SOA 1100, Peoples and Cultures; and SOC 1100, Introduction to Sociology. *Core Requirements:* at least three of the following: SOA 1335, Language and Communication; SOA 1155, Individual and Culture; SOA 1301, Human Origins; SOA 1160, Sex, Sex Roles, and Family; SOA 1425, Cultural Survival; SOA 1146, Peasants: Community, Culture, and Rebellion; SOA 1470, Myth and Religion. *Elective requirements.* At least six additional anthropology courses; and one sociology elective beyond SOC 1100.

Six electives in the social sciences other than sociology/anthropology.

In addition, complete the arts and sciences core curriculum (see page 2).

Bachelor of Science

Preparatory requirements. SOA 1100, Peoples and Cultures; and SOC 1100, Introduction to Sociology. *Core requirements.* At least three of the following: SOA 1335, Language and Communication; SOA 1155, Individual and Culture; SOA 1301, Human Origins; SOA 1160, Sex, Sex Roles, and Family; SOA 1425, Cultural Survival; SOA 1146, Peasants: Community, Culture, and Rebellion; SOA 1470, Myth and Religion. *Elective requirements.* At least six additional anthropology courses; and one sociology elective beyond SOC 1100.

Six electives in the social sciences other than sociology/anthropology. Approved five-course specialization.

In addition, complete the arts and sciences core curriculum (see page 2).

Minor in Anthropology

Requirements. SOA 1100, Peoples and Cultures; SOA 1335, Language and Communication; SOA 1155, Indi-

vidual and Culture; SOA 1160, Sex, Sex Roles, and Family; and any two-course specialization in anthropology arranged between the student and adviser.

Speech Communication

Concentration in General Speech Communication

Bachelor of Arts
Bachelor of Science

Required courses. SPC 1115, Introduction to Communication Skills; SPC 1116, Business and Professional Speaking; SPC 1250, Introduction to Mass Communication; SPC 1300, Introduction to Communication Theory; SPC 1330, Interpersonal Communication 1; and SPC 1600, Introduction to Communication Research or SPC 1610, Rhetorical Criticism.

Eight speech communication electives selected in consultation with an adviser.

In addition, complete the arts and sciences core curriculum (see page 2).

Concentration in Communication Research and Theory

Bachelor of Arts
Bachelor of Science

Required courses. SPC 1115, Introduction to Communication Skills; SPC 1116, Business and Professional Speaking; SPC 1250, Introduction to Mass Communication; SPC 1300, Introduction to Communication Theory; SPC 1310, Rhetorical Theory 1; SPC 1315, Theories of Persuasion; SPC 1317, Theories of Audience Behavior; SPC 1330, Interpersonal Communication 1; SPC 1600, Introduction to Communication Research; and SPC 1610, Rhetorical Criticism.

Five of the following courses. SPC 1318, Negotiation Skills; SPC 1410, Contemporary Public Address; SPC 1430, Organizational Communication; SPC 1437, Consultation Skills; SPC 1451, Foundations of Broadcasting; SPC 1555, Communication and the Quality of Life; SPC 1890, Directed Study; and SPC 1895, Internship.

In addition, complete the arts and sciences core curriculum (see page 2).

Concentration in Radio and Television

Bachelor of Arts
Bachelor of Science

Required courses. SPC 1115, Introduction to Communication Skills; SPC 1116, Business and Professional Speaking; SPC 1250, Introduction to Mass Communication; SPC 1300, Introduction to Communication Theory; SPC 1330, Interpersonal Communication 1; SPC 1450, Television 1; SPC 1451, Foundations of Broadcasting; SPC 1452, Radio 1; and SPC 1600, Introduction to Communication Research or SPC 1610, Rhetorical Criticism.

Five of the following courses. SPC 1111, Oral Interpretation; SPC 1317, Theories of Audience Behavior; SPC 1430, Organizational Communication; SPC 1431, Mass Communication and the Organization; SPC 1453, Broadcast Management; SPC 1454, Special Topics (with permission of adviser); SPC 1455, Television 2; SPC 1500, Special Topics in Speech Communication (with permission of adviser); SPC 1890, Directed Study; SPC 1895, Internship; JRN 1422, Television News Production; and SPC 1555, Communication and the Quality of Life.

In addition, complete the arts and sciences core curriculum (see page 2).

Concentration in Interpersonal and Organizational Communication

Bachelor of Arts
Bachelor of Science

Required courses. SPC 1115, Introduction to Communication Skills; SPC 1116, Business and Professional Speaking; SPC 1250, Introduction to Mass Communication; SPC 1300, Introduction to Communication Theory; SPC 1330, Interpersonal Communication 1; SPC 1331, Interpersonal Communication 2; SPC 1338, Group Discussion; SPC 1430, Organizational Communication; and SPC 1600, Introduction to Communication Research or SPC 1610, Rhetorical Criticism.

Five of the following courses. SPC 1232, Female/Male Communication; SPC 1315, Theories of Persuasion; SPC 1318, Negotiation Skills; SPC 1431, Mass Communication and the Organization; SPC 1437, Consultation Skills; SPC 1500, Special Topics in Speech Communication (with permission of adviser); and SPC 1555, Communication and the Quality of Life.

In addition, complete the arts and sciences core curriculum (see page 2).

Concentration in Rhetoric, Advocacy, and Public Address

Bachelor of Arts
Bachelor of Science

Required courses. SPC 1115, Introduction to Communication Skills; SPC 1116, Business and Professional Speaking; SPC 1250, Introduction to Mass Communication; SPC 1300, Introduction to Communication Theory; SPC 1330, Interpersonal Communication; SPC 1600, Introduction to Communication Research or SPC 1610, Rhetorical Criticism; SPC 1310, Rhetorical Theory or SPC 1315, Theories of Persuasion; SPC 1110, Voice and Articulation or SPC 1111, Oral Interpretation or SPC 1338, Group Discussion; and SPC 1239, Argumentation and Debate or SPC 1410, Contemporary Public Address or SPC 1415, Persuasive Techniques.

Five of the following courses. SPC 1110, Voice and Articulation; SPC 1111, Oral Interpretation; SPC 1239, Argumentation and Debate; SPC 1240, Competitive

Strategies in Oral Communication; SPC 1310, Rhetorical Theory; SPC 1315, Theories of Persuasion; SPC 1317, Theories of Audience Behavior; SPC 1318, Negotiation Skills; SPC 1338, Group Discussion; SPC 1410, Contemporary Public Address; SPC 1415, Persuasive Techniques; SPC 1450, Television 1; SPC 1452, Radio 1; SPC 1500, Special Topics in Speech Communication (with permission of adviser); SPC 1600, Introduction to Communication Research; SPC 1890, Directed Study; SPC 1895, Internship; and SPC 1555, Communication and the Quality of Life.

Minor in Speech

Required courses. SPC 1116, Business and Professional Speaking; SPC 1300, Introduction to Communication Theory; SPC 1330, Interpersonal Communication 1; and SPC 1338, Group Discussion.

Four of the following courses. SPC 1110, Voice and Articulation; SPC 1111, Oral Interpretation; SPC 1232, Female/Male Communication; SPC 1239, Argumentation and Debate; SPC 1240, Competitive Strategies in Oral Communication; SPC 1250, Introduction to Mass Communication; SPC 1315, Theories of Audience Behavior; SPC 1318, Negotiation Skills; SPC 1331, Interpersonal Communication 2; SPC 1410, Contemporary Public Address; SPC 1415, Persuasive Techniques; SPC 1437, Consultation Skills; and SPC 1600, Introduction to Communication Research.

Theatre and Dance

Bachelor of Arts

Bachelor of Science

Theatre majors have the opportunity, after the completion of 32 QH, to select one of three concentrations: theatre generalist, production, or performance. Admission to a concentration is by petition or audition.

All theatre majors are required to complete the following department core courses: DRA 1100, Introduction to the Theatre Arts; DRA 1106, Theatre History 1; DRA 1107, Theatre History 2; DRA 1112, Dramatic Theory/Criticism; DRA 1114, Masters of Theatre; DRA 1149, Script Analysis; DRA 1150, Acting 1; DRA 1180, Concepts of Direction; DRA 1200, Stagecraft; DRA 1212, Introduction to Theatrical Design; and DRA 1800, DRA 1801, DRA 1802, and DRA 1803, Practicum in Production. All theatre majors must take ENG 1658, Introduction to Shakespeare, in the college core curriculum.

All theatre majors should select the following courses in their *freshman* year: DRA 1100, Introduction to Theatre Arts; DRA 1150, Acting 1; DRA 1200, Stagecraft; and DRA 1212, Introduction to Theatrical Design.

The following lists specify the requirements for each concentration.

Theatre Generalist. DRA 1116, American Theatre or DRA 1121, Contemporary Theatre; DRA 1210, Scene Design 1; DRA 1226, Lighting for the Stage; DRA 1261, Costuming 1; DRA 1505, Continental Theatre; DRA 1510, Twentieth Century Theatre; and four courses from the following group: DRA 1140, Playwriting; DRA 1160, Body Movement 1; DRA 1280, Stage Makeup; DRA 1284, Theatre Management; DRA 1325, Musical Theatre Technique; or DRA 1410, Technical Production.

Production. DRA 1209, Theatrical Drafting; DRA 1210, Scene Design 1; DRA 1226, Lighting for the Stage; DRA 1261, Costuming 1; DRA 1284, Theatre Management; DRA 1410, Technical Production; DRA 1505, Continental Drama; DRA 1510, Twentieth Century Theatre; and two courses from the following list: DRA 1213, Scene Design 2; DRA 1225, Scene Painting; DRA 1265, Pattern Drafting; DRA 1280, Stage Makeup; DRA 1400, Costuming 2; or DRA 1430, Lighting 2. All production concentration majors must take electives ART 1101, Art History Since 1400 and ART 1124, Creative Drawing.

Performance. DRA 1116, American Theatre or DRA 1121, Contemporary Theatre; DRA 1155, Voice for the Theatre; DRA 1160, Body Movement 1; DRA 1280, Stage Makeup; DRA 1301, Acting 3; DRA 1302, Acting 4; DRA 1316, Acting for the Camera; DRA 1325, Musical Theatre Technique; DRA 1505, Continental Drama; and DRA 1510, Twentieth Century Theatre. All performance concentration majors must take 4 QH of dance/physical education electives (HSL).

Dance. Not available 1990–1991 academic year.

All students must complete the arts and sciences core curriculum (see page 2).

Minor in Theatre

All students minoring in theatre are required to complete the following courses (for 32 QH): DRA 1100, Introduction to Theatre Arts; DRA 1106, Theatre History 1; DRA 1107, Theatre History 2; DRA 1108, Theatre History 3; DRA 1150, Introduction to Acting; DRA 1180, Concepts of Direction; DRA 1200, Stagecraft; and DRA 1212, Introduction to Theatrical Design. Lab practice in technical theatre and performance, in conjunction with the course requirements, is a required part of the minor.

Boston-Bouvé College of Human Development Professions

Specimen Program in Athletic Training

Not all curriculum changes had received final approval at the time this book was published. A copy of the approved curriculum for this program is available in the dean's office, 100 Dockser Hall.

First Year (for students entering Fall 1990)

| Quarter 1 | | | Quarter 2 | | | Quarter 3 | | |
|-----------|----------------------|----|-----------|---------------|----|-----------|----------------|----|
| No. | Course | QH | No. | Course | QH | No. | Course | QH |
| BIO 1140 | Animal Bio. 1 | 4 | BIO 1141 | Animal Bio. 2 | 4 | CHM 1112 | Gen. Chemistry | 5 |
| ENG 1110 | Fresh. Eng. 1 | 4 | CHM 1111 | Chemistry 1 | 5 | HSL 1254 | First Aid | 2 |
| HSL 1133 | Phys. Cond. | 1 | ENG 1111 | Fresh. Eng. 2 | 4 | MTH 1106 | Fund. of Math | 4 |
| HSL 1281 | Current Hlth. Issues | 4 | PSY 1111 | Psychology 1 | 4 | _____ | Elective | 3 |
| INT 1100 | Beg. Computer Use | 4 | | | | | | |

Specimen Program in Cardiovascular Health and Exercise

Not all curriculum changes had received final approval at the time this book was published. A copy of the approved curriculum for this program is available in the dean's office, 100 Dockser Hall.

First Year (for students entering Fall 1990)

| Quarter 1 | | | Quarter 2 | | | Quarter 3 | | |
|-----------|------------------|----|-----------|---------------|----|-----------|--------------------|----|
| No. | Course | QH | No. | Course | QH | No. | Course | QH |
| BIO 1140 | Animal Bio. 1 | 4 | BIO 1141 | Animal Bio. 2 | 4 | HSL 1101 | Int. Swimming | 1 |
| ENG 1110 | Fresh. Eng. 1 | 4 | CHM 1111 | Chemistry 1 | 5 | HSL 1134 | Aerobic Exerc. | 1 |
| HSL 1133 | Phys. Cond. | 1 | ENG 1111 | Fresh. Eng. 2 | 4 | HSL 1254 | First Aid | 2 |
| PSY 1111 | Psychology 1 | 4 | HSL 1132 | Weight Trng. | 1 | HSL 1281 | Curr. Hlth. Issues | 4 |
| _____ | Soc. Sci. Elect. | 4 | _____ | Elective | 4 | INT 1100 | Beg. Computer Use | 4 |

Specimen Program in Physical Education Teacher Preparation

As of October 1, 1994, candidates seeking provisional teacher certification at any grade level (N-12) in the Commonwealth of Massachusetts need to earn a bachelor's degree with a major in the liberal arts and sciences. Within five years from becoming provisionally certified, candidates must complete a master's degree in the appropriate teaching discipline to become fully certified in Massachusetts. Accordingly, in addition to extensive study in physical education, each student beginning the program in Fall 1990 must select a major within the College of Arts and Sciences.

First Year (for students entering Fall 1990)

| Quarter 1 | | | Quarter 2 | | | Quarter 3 | | |
|-----------|--------------------------|----|-----------|--------------------------|----|-----------|--------------------------|----|
| No. | Course | QH | No. | Course | QH | No. | Course | QH |
| ENG 1110 | Fresh. Eng. 1 | 4 | HSL 1109 | Gymnastics 1 | 1 | HSL 1112 | Gym | 1 |
| HSL 1101 | Int. Swim. | 1 | HSL 1140 | Basketball | 1 | HSL 1173 | Track & Field | 1 |
| HSL 1133 | Phys. Cond. | 1 | HSL 1254 | First Aid | 2 | INT 1100 | Beg. Computer Use | 4 |
| HSL 1255 | Human Move. | 3 | _____ | A & S Core and Electives | 12 | _____ | A & S Core and Electives | 12 |
| _____ | A & S Core and Electives | 8 | | | | | | |

Physical Education Major Courses: Second through Fifth Years

| No. | Course | QH | No. | Course | QH |
|----------|------------------------------|----|-----------|---|------|
| HSL 1255 | Human Movement | 4 | HSL _____ | Theory/Method of Coaching Sport or | 4 |
| HSL 1258 | Elementary School Activities | 3 | HSL _____ | Foundations of Dance Education | 4 |
| HSL 1259 | Secondary School Activities | 3 | HSL _____ | Motor Development & Learning | 4 |
| HSL 1261 | Anatomy & Physiology 1 | 4 | HSL _____ | Sport & Dance | 6 |
| HSL 1463 | Overview of Disabilities | 4 | HSL _____ | Personal Performance (a course or competency waiver in thirteen specified performance areas; only 6 QH of these may be applied toward the graduation QH minimum.) | |
| HSL 1610 | Anatomy & Physiology 2 | 4 | HSL _____ | Electives | 0-12 |
| HSL 1611 | Kinesiology | 4 | | | |
| HSL 1612 | Exercise Physiology | 4 | | | |
| HSL 1615 | Critical Teaching Skills | 4 | | | |
| HSL 1802 | Student Teaching 1 | 6 | | | |
| HSL 1803 | Student Teaching 2 | 6 | | | |

Specimen Program in Recreation Management

First Year

| Quarter 1 | | | Quarter 2 | | | Quarter 3 | | |
|-----------|-----------------------------|----|-----------|----------------------|----|-----------|--------------------|----|
| No. | Course | QH | No. | Course | QH | No. | Course | QH |
| ED 1100 | Soc. Sci. | 4 | BIO 1140 | Animal Bio. 1 | 4 | ED ____ | Found. Ed. | 4 |
| ENG 1110 | Fresh. Eng. 1 | 4 | ENG 1111 | Fresh. Eng. 2 | 4 | HSL 1253 | Group Dynamics | 3 |
| HSL 1220 | Fdn. Ldship/Leisure Studies | 4 | HSL 1223 | Life Career Planning | 4 | HSL 1281 | Curr. Hlth. Issues | 4 |
| SPC 1115 | Comm. Skills | 4 | INT 1100 | Beg Computer Use | 4 | HSL ____ | Prof. Skills | 4 |
| | | | | | | MTH 1106 | Fund. of Math | 4 |

Second Year

| Quarter 4 | | | Quarter 5 | | |
|-----------|------------------------|----|-----------|------------------|----|
| No. | Course | QH | No. | Course | QH |
| ED 1102 | Human Dev. 1 | 4 | ED 1103 | Human Dev. 2 | 4 |
| HSL 1221 | Int. Rec. & Les. Serv. | 3 | HSL 1610 | Anat./Phys. 2 | 4 |
| HSL 1261 | Anat./Phys. 1 | 4 | _____ | Guided Elective | 4 |
| _____ | Science Elective | 4 | _____ | Science Elective | 4 |

Third Year

| Quarter 6* | | | Quarter 7 | | |
|------------|------------------|----|-----------|------------------|----|
| No. | Course | QH | No. | Course | QH |
| HSL 1408 | Research Methods | 4 | HSL 1401 | Program Planning | 4 |
| HSL 1423 | Comm. Rec. Mgmt. | 3 | HSL 1409 | Research App. | 4 |
| HSL 1426 | Budget Analysis | 4 | HSL ____ | Dept. Elective | 3 |
| _____ | Guided Elective | 4 | _____ | Guided Electives | 8 |

Fourth Year

| Quarter 8 | | | Quarter 9 | | |
|-----------|-------------------|----|-----------|----------------------|----|
| No. | Course | QH | No. | Course | QH |
| HSL 1400 | Org. Behavior | 3 | HSL 1800 | Superv. Field Exp. 1 | 6 |
| HSL 1406 | Internship Sem. | 1 | HSL 1801 | Superv. Field Exp. 2 | 6 |
| HSL 1446 | El. Out. Rec. Pl. | 4 | | | |
| HSL ____ | Dept. Elective | 3 | | | |
| _____ | Guided Elective | 4 | | | |

Fifth Year

| Quarter 10 | | | Quarter 11 | | |
|------------|-------------------------------|----|------------|----------------------|----|
| No. | Course | QH | No. | Course | QH |
| HSL 1403 | Concepts of Leisure | 4 | HSL 1410 | Senior Seminar | 4 |
| HSL 1422 | Prog. Eval. in Rec. | 4 | HSL 1421 | Adm. of Rec. & Parks | 4 |
| HSL 1467 | Soc. Psych. Impact of Illness | 4 | HSL ____ | Ther. Rec. Elective | 4 |
| _____ | Guided Elective | 4 | _____ | Guided Elective | 4 |

*Beginning with quarter 6, use one elective space to fulfill the middler year writing requirement.

173 QH = Minimum graduation requirement.

Specimen Program in Therapeutic Recreation

First Year

| Quarter 1 | | | Quarter 2 | | | Quarter 3 | | |
|-----------|-------------------|----|-----------|----------------------|----|-----------|--------------------|----|
| No. | Course | QH | No. | Course | QH | No. | Course | QH |
| ED 1100 | Soc. Sci. | 4 | BIO 1140 | Animal Bio. 1 | 4 | ED ____ | Found. Ed. | 4 |
| ENG 1110 | Fresh. Eng. 1 | 4 | ENG 1111 | Fresh. Eng. 2 | 4 | HSL 1253 | Group Dynamics | 3 |
| HSL 1220 | Fn. Ldsp. Ls. Sv. | 4 | HSL 1223 | Life Career Planning | 4 | HSL 1281 | Curr. Hlth. Issues | 4 |
| SPC 1115 | Comm. Skills | 3 | INT 1100 | Beg Computer Use | 4 | HSL ____ | Prof. Skills | 4 |
| | | | | | | MTH 1106 | Fund. of Math | 4 |

Second Year

| Quarter 4 | | | Quarter 5 | | |
|-----------|-----------------------|----|-----------|------------------|----|
| No. | Course | QH | No. | Course | QH |
| ED 1102 | Human Dev. 1 | 4 | ED 1103 | Human Dev. 2 | 4 |
| HSL 1221 | Int. Rc. & Les. Serv. | 3 | HSL 1610 | Anat./Phys. 2 | 4 |
| HSL 1261 | Anat./Phys. 1 | 4 | _____ | Guided Elective | 4 |
| _____ | Science Elective | 4 | _____ | Science Elective | 4 |

Third Year

| Quarter 6* | | | Quarter 7 | | |
|------------|------------------|----|-----------|------------------|----|
| No. | Course | QH | No. | Course | QH |
| HSL 1408 | Research Methods | 4 | HSL 1401 | Program Planning | 4 |
| HSL 1463 | Overview of Dis. | 4 | HSL 1409 | Research App. | 4 |
| HSL 1464 | Prog. Plan. T/R | 4 | _____ | Guided Electives | 8 |
| _____ | Guided Elective | 4 | | | |

Fourth Year**Quarter 8**

| No. | Course | QH |
|----------|-------------------|----|
| HSL 1400 | Org. Behavior | 3 |
| HSL 1406 | Intnship. Sem. | 1 |
| HSL 1426 | Budget Analysis | 4 |
| HSL 1466 | Fdn. Psych. Serv. | 4 |
| | Guided Elective | 4 |

Quarter 9

| No. | Course | QH |
|----------|----------------------|----|
| HSL 1800 | Superv. Field Exp. 1 | 6 |
| HSL 1801 | Superv. Field Exp. 2 | 6 |

Fifth Year**Quarter 10**

| No. | Course | QH |
|----------|---------------------|----|
| HSL 1403 | Concepts of Leisure | 4 |
| HSL 1467 | Soc. & Psy. Imp. | 4 |
| | Guided Electives | 8 |

Quarter 11

| No. | Course | QH |
|----------|------------------------|----|
| HSL 1410 | Senior Seminar | 4 |
| HSL 1421 | Admin. of Rec. & Parks | 4 |
| HSL 1462 | Leisure Couns. | 4 |
| | Guided Elective | 4 |

*Beginning with quarter 6, use one elective space to fulfill the middler year writing requirement.

173 QH = Minimum graduation requirement.

Specimen Program in School and Community Health Education

As of October 1, 1994, candidates seeking provisional teacher certification at any grade level (N-12) in the Commonwealth of Massachusetts need to earn a bachelor's degree with a major in the liberal arts and sciences. Within five years from becoming provisionally certified, candidates must complete a master's degree in the appropriate teaching discipline to become fully certified to teach in Massachusetts. Accordingly, in addition to extensive study in health education, each student beginning the program in Fall 1990 must select a major within the College of Arts and Sciences.

Due to extensive curriculum changes mandated by the Commonwealth of Massachusetts' new requirements, not all curricula had received final approval at the time this book was published. A copy of the approved curriculum for the school and community health education program is available in the dean's office, 100 Dockser Hall.

First Year (for students entering Fall 1990)

Quarter 1

| No. | Course | QH |
|-----|--------------------------|----|
| | A & S Core and Electives | 16 |

Quarter 2

| No. | Course | QH |
|----------|--------------------------|----|
| | A & S Core and Electives | 16 |
| HSL 1254 | First Aid | 2 |

Quarter 3

| No. | Course | QH |
|----------|--------------------------|----|
| | A & S Core and Electives | 12 |
| HSL 1101 | Beg Computer Use | 4 |

Second through Fifth Years

| No. | Course | QH |
|----------|-----------------------------------|----|
| BIO 1150 | Anatomy & Physiology 1 | 4 |
| BIO 1151 | Anatomy & Physiology 2 | 4 |
| HSL — | Foundations of Health Education | 4 |
| HSL — | Epidemiology & Disease Prevention | 4 |
| HSL 1254 | First Aid & CPR | 2 |
| HSL 1285 | Health Concerns of Youth | 4 |
| HSL 1286 | Nutrition | 4 |

| No. | Course | QH |
|----------|--------------------------|-----|
| HSL 1500 | Mental Health | 4 |
| HSL 1503 | Human Sexuality & Family | 4 |
| HSL 1506 | Community Health | 4 |
| HSL 1508 | Senior Seminar | 2 |
| HSL 1510 | Health Counseling | 4 |
| HSL 1516 | Drug Use/Abuse | 4 |
| HSL 1585 | Teaching Procedures | 4 |
| HSL 1802 | Student Teaching | 6 |
| HSL 1803 | Student Teaching | 6 |
| HSL — | Electives | 0-8 |

Specimen Program in Physical Therapy

First Year**Quarter 1**

| No. | Course | QH |
|----------|------------------|----|
| CHM 1111 | Gen. Chemistry 1 | 5 |
| MTH 1106 | Fund. of Math. | 4 |
| PSY 1111 | Fnd. of Psych. 1 | 4 |

Quarter 2

| No. | Course | QH |
|----------|------------------|----|
| BIO 1152 | Anat. & Phys. 1 | 4 |
| CHM 1112 | Gen. Chemistry 2 | 4 |
| ENG 1110 | Fresh. Eng. 1 | 4 |

Quarter 3

| No. | Course | QH |
|----------|------------------------|----|
| BIO 1153 | Anat. & Phys. 2 | 4 |
| ENG 1111 | Fresh. Eng. 2 | 4 |
| MTH 1107 | Func. & Basic Calculus | 4 |

Quarter 1, 2, or 3

| No. | Course | QH |
|----------|------------------------|----|
| HSL 1254 | First Aid | 2 |
| HSL 1281 | Curr. Hlth. Issues | 4 |
| INT 1100 | Beginning Computer Use | 4 |
| PTH 1114 | In. Phys. Thpy. 1 | 2 |

Second Year**Quarter 4**

| No. | Course | QH |
|----------|---|----|
| BIO 1154 | Anat. & Phys. 3 | 4 |
| PHY 1201 | Phys. Life Sci. 1 | 4 |
| PHY 1501 | Phys. Lab L.S. 1 | 1 |
| PTH 1114 | Intro. Phys. Thrpy. 1 (transfers only) | 2 |
| PTH 1118 | Dev. Basis Human Perform. | 4 |
| _____ | Elective* | 4 |

Quarter 5

| No. | Course | QH |
|----------|-----------------------|----|
| PHY 1202 | Phys. Life Sci. 2 | 4 |
| PSY 1112 | Fnd. Psych. 2 | 4 |
| PTH 1115 | Intro. Phys. Thrpy. 2 | 2 |
| _____ | Elective* | 4 |
| _____ | Elective* | 4 |

Third Year**Quarter 6**

| No. | Course | QH |
|----------|----------------------|----|
| PTH 1310 | Clin. Gross Anat. | 6 |
| PTH 1315 | Physiology for P.Ts. | 5 |
| PTH 1320 | Phys. Thrpy. 1 | 2 |
| PTH 1325 | Clin. Medicine 1 | 4 |

Quarter 7

| No. | Course | QH |
|----------|---------------------|----|
| ENG 1340 | Writing Workshop | 1 |
| PTH 1330 | Clin. Kinesiology | 5 |
| PTH 1335 | Phys. Thrpy. 2 | 3 |
| PTH 1340 | Phys. Thrpy. 3 | 4 |
| PTH 1345 | Clin. Medicine 2 | 3 |
| PTH 1352 | Psych. Asp. of Ill. | 3 |

Fourth Year**Quarter 8**

| No. | Course | QH |
|----------|----------------|----|
| PTH 1355 | Phys. Thrpy. 4 | 3 |
| PTH 1360 | Phys. Thrpy. 5 | 4 |
| PTH 1366 | Neuroanatomy | 5 |
| PTH 1370 | Clin. Seminar | 2 |

Quarter 9

| No. | Course | QH |
|----------|----------------------|----|
| PTH 1375 | Phys. Thrpy. 7 | 2 |
| PTH 1380 | Superv. Clin. Ed. 1 | 5 |
| PTH 1385 | Clin. Medicine 3 | 3 |
| PTH 1390 | Phys. Thrpy. 6 | 3 |
| PTH 1395 | Phys. Thrpy. 5 cont. | 1 |

Fifth Year**Quarter 10**

| No. | Course | QH |
|----------|-------------------|----|
| PTH 1400 | Admin. | 4 |
| PTH 1405 | Res. Phys. Thrpy. | 4 |
| PTH 1411 | Phys. Thrpy. 8 | 4 |
| _____ | Elective | 4 |
| _____ | Elective | 4 |

Quarter 11

| No. | Course | QH |
|----------|---------------------|----|
| PTH 1415 | Superv. Clin. Ed. 2 | 0 |

Quarter 12

| No. | Course | QH |
|----------|--------------------|----|
| PTH 1420 | PT Hlth. Care Sys. | 3 |
| PTH 1426 | Fn. As. Eld. Cli. | 3 |
| PTH 1450 | Invest. Studies | 6 |
| _____ | Elective | 4 |

In quarters 10 and 11 the class is divided in half, with half of the class on campus and half in Supervised Clinical Education 2 for one quarter each.

*One elective must be selected from each of three academic areas: philosophy, fine arts, and political science or history.

Specimen Program in Human Services**Quarter 1**

ED 1100, Education and Social Science, or SOC 1100, Introduction to Sociology; ENG 1110, Freshman English 1; POL 1111, Introduction to American Government, or another approved political science course; college distribution requirement.

Quarter 2

ED 1302, Introduction to Human Services Professions; ED 1102, Human Development 1 or PSY 1111, Foundations of Psychology 1; ENG 1111, Freshman English 2; and a social and communities issues course.

Quarter 3

ED 1103, Human Development 2, or PSY 1112, Foundations of Psychology 2; ECN 1116, Principles of Microeconomics, or another approved economics course; college distribution requirement; and a computer literacy course.

Bachelor of Science

Prerequisite courses. ED 1100, Education and Social Science, or SOC 1100, Introduction to Sociology; ED 1302, Introduction to Human Services Professions; ED 1102, Human Development 1, or PSY 1111, Foundations of Psychology 1; ED 1103 Human Development 2, or PSY 1112, Foundations of Psychology 2;

POL 1111, Introduction to American Government, or another approved political science course; and ECN 1116, Principles of Microeconomics, or another approved economics course.

Core courses. ED 1307, Introduction to Educational Statistics, or SOC 1320, Introduction to Statistical Analysis, or PSY 1211, Statistics in Behavioral Science 1; SOC 1324, Human Services Research and Evaluation, or PSY 1511, Experimental Design in Psychology, or SOC 1321, Research Methods 1; SOC 1240, Sociology of Human Services Organizations; PSY 1272, Personality 1; PSY 1373, Abnormal Psychology 1; ED 1300, Education and Psychosocial Development; ED 1317, Seminar on Group Process, or SPC 1330, Interpersonal Communication 1, or SPC 1338, Group Discussion; CRS 1310, Intervention Strategies; and INT 1333, Senior Seminar in Human Services.

Social and community issues courses. Three courses focused on subjects such as poverty and welfare, minority affairs, special needs populations, and other contemporary American social problems, chosen with the student's academic adviser.

Human service fieldwork. INT 1330, Field Experience in Human Services 1; INT 1331, Field Experience in Human Services 2. **Human services specializations.** Five courses in a particular subfield of human services, chosen with the student's academic adviser. Alternatives are grouped in three clusters: clinical, community, and administration.

University and college requirements. Computer literacy requirement; Freshman English 1 and 2; Middler Year Writing Requirement; distribution requirements of four math/science and four humanities courses; eleven Boston-Bouvé College courses taken among those normally required to complete degree requirements.

Specialization in Deaf Studies

Prerequisite, core, and fieldwork courses follow the standard human services major.

Three social and community issues courses, selected from the subjects suggested above, and/or from the following. PSY1271, Social Psychology, or SOC1135, Social Psychology; SOA1135 Language and Culture; SOA1101, Culture, Meaning, and Everyday Experience; ENG1118, Introduction to Language; PSY1263,

Body Language; SOC1140, Sociology of Prejudice; SPC1232, Male and Female Communication; CRS1314, Introduction to Counseling. *Deaf studies specialization.* ASL 1101, American Sign Language 1; ASL 1102, American Sign Language 2; ASL 1201, Intermediate American Sign Language 1; ASL 1202, Intermediate American Sign Language 2; and one to five courses selected from: ASL 1211, Deaf Culture; ASL 1212, Deaf History; PSY 1363, American Sign Language Linguistics; PSY 1261, Bilingualism; SLA 1101, Introduction to Speech and Hearing; and ASL 1401, American Sign Language Literature.

176 QH = Minimum graduation requirement.

Education Programs

Early Childhood Education Elementary Education and High School Teacher Certification

General requirements.

1. Effective October 1, 1994, all students seeking teaching certificates in Massachusetts at any grade level (K-12) will need a degree that consists of both a major in the arts and sciences and a program of study in education. Arts and sciences majors are available only in the College of Arts and Sciences; programs in education are available through the Boston-Bouvé College of Human Development Professions.

2. Students who wish to obtain certification as an early childhood education teacher or an elementary education teacher should enroll in the Boston-Bouvé College dual-major program. These students will be assigned advisers from both Boston-Bouvé and the College of Arts and Sciences. Advisers help the student plan an appropriate education/arts and sciences dual major. The dual major includes a major in education, a major in the arts and sciences, and distribution requirements. Specimen dual major programs are available in 54 Lake Hall.

3. Students who wish to obtain high school teacher certification should enroll in the College of Arts and Sciences and select an appropriate major. Students should also select a minor in education. The requirements of the education minor can be obtained in 54 Lake Hall.

College of Business Administration

Specimen Program for First Three Quarters

The courses taken in the first three quarters are the same for all concentrations.

| Quarter 1 | | | Quarter 2 | | | Quarter 3 | | |
|-----------|-------------------|----|-----------|-------------------|----|-----------|-----------------|----|
| No. | Course | QH | No. | Course | QH | No. | Course | QH |
| ECN 1105 | Econ. Princ. | 4 | ECN 1106 | Econ. Prin. | 4 | ENG 1111 | Fresh. Eng. 2 | 4 |
| ENG 1110 | Fresh. Eng. 1 | 4 | MTH 1113 | Math for Bus. or | 4 | MGT 1115 | Intro. Bus. | 4 |
| MTH 1113 | Math for Bus. or | 4 | MTH 1114 | Calculus for Bus. | 4 | | A & S Electives | 8 |
| MTH 1114 | Calculus for Bus. | 4 | | A & S Electives | 8 | | | |
| | A & S Electives | 8 | | | | | | |

During the five-year program at least one elective must be taken from the approved international elective list.

Accounting

| | |
|-------------------|---|
| Quarter 4 | ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; MSC 1226, Introduction to Data Processing; and one nonbusiness elective. |
| Quarter 5 | ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; and two nonbusiness electives. |
| Quarter 6 | ACC 1331, Intermediate Accounting 1; FIN 1438, Principles of Finance 1; and HRM 1433, Organizational Behavior and Design. |
| Quarter 7 | ACC 1332, Intermediate Accounting 2; ACC 1339, Cost Accounting 1; FIN 1439, Principles of Finance 2; and MKT 1435, Introduction to Marketing. |
| Quarter 8 | ACC 1343, Intermediate Accounting 3; ACC 1345, Accounting Systems; MSC 1441, Operations Management; and one nonbusiness elective. |
| Quarter 9 | ACC 1347, Auditing; MSC 1433, Quantitative Models in Business; MGT 1446, Managing Social Issues; and upper division writing requirement. |
| Quarter 10 | ACC 1351, Federal Income Tax 1; MGT 1450, Business Policy; and two open electives. |
| Quarter 11 | Three open electives; and a nonbusiness elective. |

Entrepreneurship and New Venture Management

| | |
|-------------------|--|
| Quarter 4 | ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; MSC 1226, Introduction to Data Processing; and one nonbusiness elective. |
| Quarter 5 | ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; and two nonbusiness electives. |
| Quarter 6 | ENT 1330, Management of Smaller Enterprises; FIN 1438, Principles of Finance 1; MKT 1435, Introduction to Marketing; and an open elective. |
| Quarter 7 | FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and MSC 1433, Quantitative Models in Business. |
| Quarter 8 | ENT 1344, Opportunity Analysis and Venture Capital; a nonbusiness elective; an open elective; and upper division writing requirement. |
| Quarter 9 | FIN 1770, Small Business Finance; MGT 1446, Managing Social Issues; MSC 1441, Operations Management; and an open elective. |
| Quarter 10 | MGT 1450, Business Policy; ENT 1352, New Venture Creation; a nonbusiness elective; and an open elective. |
| Quarter 11 | ENT 1358, Small Business Institute Field Project; and two open electives. |

Finance and Insurance

| | |
|-------------------|---|
| Quarter 4 | ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; and two nonbusiness electives. |
| Quarter 5 | ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; MSC 1226, Introduction to Data Processing; and a nonbusiness elective. |
| Quarter 6 | FIN 1438, Introduction to Finance; FIN 1333, Financial Institutions and Markets; MKT 1435, Introduction to Marketing; and a nonbusiness elective. |
| Quarter 7 | FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and MSC 1433, Quantitative Models in Business. |
| Quarter 8 | FIN 1335, Managerial Finance; FIN 1346, Investment Management; upper division writing requirement; and an open elective. |
| Quarter 9 | MSC 1441, Operations Management; MGT 1446, Managing Social Issues; Finance elective; and an open elective. |
| Quarter 10 | MGT 1450, Business Policy; Finance elective; and two open electives. |
| Quarter 11 | Finance elective; and three open electives. |

Human Resources Management

| | |
|-------------------|--|
| Quarter 4 | ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; MSC 1226, Introduction to Data Processing; and one nonbusiness elective. |
| Quarter 5 | ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; and three nonbusiness electives. |
| Quarter 6 | FIN 1438, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; and MSC 1433, Quantitative Models in Business. |
| Quarter 7 | FIN 1439, Principles of Finance 2; HRM 1332, Introduction to Human Resource Management; MKT 1435, Introduction to Marketing; and an open elective. |
| Quarter 8 | HRM 1348, Reward Systems; HRM 1349, Assessment of Prospective Employees; MSC 1441, Operations Management; and an open elective. |
| Quarter 9 | MGT 1446, Managing Social Issues; Human Resources Management elective; upper division writing requirement; and an open elective. |
| Quarter 10 | HRM 1345, Contemporary Labor Issues; MGT 1450, Business Policy; Human Resources Management elective; and an open elective. |
| Quarter 11 | Nonbusiness elective; and three open electives. |

International Business Administration

| | |
|-------------------|---|
| Quarter 4 | ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; and two nonbusiness electives. |
| Quarter 5 | ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; MSC 1226, Introduction to Data Processing; and two nonbusiness electives. |
| Quarter 6 | FIN 1438, Introduction to Finance; HRM 1433, Organizational Behavior and Design; and INB 1338, Introduction to International Business. |
| Quarter 7 | FIN 1439, Principles of Finance 2; FIN 1759, International Financial Markets; MKT 1435, Introduction to Marketing; and MSC 1433, Quantitative Models in Business. |
| Quarter 8 | MSC 1441, Operations Management; a business elective; an international nonbusiness elective; and an open elective. |
| Quarter 9 | MGT 1446, Managing Social Issues; upper division writing requirement; an international business elective; and an open elective. |
| Quarter 10 | MGT 1450, Business Policy; an international nonbusiness elective; and two open electives. |
| Quarter 11 | INB 1352; Seminar in International Business; an international business elective; and two open electives. |

Management

| | |
|-------------------|---|
| Quarter 4 | ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; and two nonbusiness electives. |
| Quarter 5 | ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; MSC 1226, Introduction to Data Processing; and a nonbusiness elective. |
| Quarter 6 | FIN 1438, Introduction to Finance; HRM 1433, Organizational Behavior and Design; and MSC 1433, Quantitative Models in Business. |
| Quarter 7 | ACC 1330, Cost Accounting; FIN 1439, Principles of Finance 2; HRM 1332, Introduction to Human Resource Management; and MKT 1435, Introduction to Marketing. |
| Quarter 8 | MGT 1345, Legal Aspects of Business; MSC 1441, Operations Management; a business elective; and an open elective. |
| Quarter 9 | MGT 1446, Managing Social Issues; a business elective; an open elective; and upper division writing requirement. |
| Quarter 10 | MGT 1450, Business Policy; a nonbusiness elective; and two open electives. |
| Quarter 11 | Business elective; and three open electives. |

Management Information Systems

| | |
|-------------------|--|
| Quarter 4 | ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; and two nonbusiness electives. |
| Quarter 5 | ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; MSC 1226, Introduction to Data Processing; and a nonbusiness elective. |
| Quarter 6 | FIN 1438, Introduction to Finance; HRM 1433, Organizational Behavior and Design; and MSC 1331, End User Computing. |
| Quarter 7 | FIN 1439, Principles of Finance 2; MKT 1435, Introduction to Marketing; MSC 1339, COBOL Programming; and MSC 1433, Business Modeling. |
| Quarter 8 | MSC 1441, Operations Management; MSC 1340, Advanced COBOL; a nonbusiness elective; and an open elective. |
| Quarter 9 | MGT 1446, Managing Social Issues; MSC 1349, Systems Analysis and Design; upper division writing requirement; and a nonbusiness elective. |
| Quarter 10 | MGT 1450, Business Policy; MSC 1350, Database Management Systems; and two open electives. |
| Quarter 11 | MSC 1351, Management Information Systems; and three open electives. |

Marketing

| | |
|-------------------|--|
| Quarter 4 | ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; MSC 1226, Introduction to Data Processing; and a nonbusiness elective. |
| Quarter 5 | ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; and two nonbusiness electives. |
| Quarter 6 | FIN 1438, Principles of Finance 1; MKT 1435, Introduction to Marketing; MSC 1433, Quantitative Models in Business; and an open elective. |
| Quarter 7 | FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and MKT 1331, Marketing Management. |
| Quarter 8 | MKT 1341, Marketing Research; a marketing elective; an open elective; and upper division writing requirement. |
| Quarter 9 | MGT 1446, Managing Social Issues; MSC 1441, Operations Management; a marketing elective; and an open elective. |
| Quarter 10 | MKT 1351, Competitive Strategies; MGT 1450, Business Policy; and two open electives. |
| Quarter 11 | Marketing elective; and three open electives. |

Transportation and Logistics Management

| | |
|-------------------|---|
| Quarter 4 | ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; and two nonbusiness electives. |
| Quarter 5 | ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; MSC 1226, Introduction to Data Processing; and a nonbusiness elective. |
| Quarter 6 | FIN 1438, Introduction to Finance; HRM 1433, Organizational Behavior and Design; and TRN 1333, The Domestic Transportation System. |
| Quarter 7 | FIN 1439, Principles of Finance 2; a transportation elective; MKT 1435, Introduction to Marketing; and MSC 1433, Quantitative Models in Business. |
| Quarter 8 | MSC 1441, Operations Management; a transportation elective; a nonbusiness elective; and an open elective. |
| Quarter 9 | MGT 1446, Managing Social Issues; TRN 1344, Corporate Transportation/Logistics; an open elective; and upper division writing requirement. |
| Quarter 10 | MGT 1450, Business Policy; a transportation elective; and two open electives. |
| Quarter 11 | TRN 1353, Seminar in Transportation and Logistics; and three open electives. |

College of Computer Science

Specimen Program for the Five-Year Computer Science BS Program

First Year

| Quarter 1 | | | Quarter 2 | | | Quarter 3 | | |
|-----------|------------------------|----|-----------|------------------------|----|-----------|-----------------------------|----|
| No. | Course | QH | No. | Course | QH | No. | Course | QH |
| COM 1100 | Fund of CS | 4 | COM 1101 | Alg. & Data Str 1 | 4 | COM 1110 | FORTRAN Lab | 1 |
| COM 1121 | CS Overview 1 | 1 | COM 1122 | CS Overview 2 | 1 | COM 1201 | Alg. & Data Str. 2 | 4 |
| ENG 1110 | Fresh. Eng. 1 | 4 | MTH 1124 | Calculus 2 | 4 | ENG 1111 | Fresh. Eng. 2 | 4 |
| MTH 1123 | Calculus 1 | 4 | MTH 1137 | Discr. Math 1 | 4 | MTH 1125 | Calculus 3 | 4 |
| | Basic Soc Sci elect. 2 | 4 | | Basic Soc Sci elect. 2 | 4 | | Subarea or general elect. 1 | 4 |

Second Year

| Quarter 4 | | | Quarter 5 | | |
|-----------|-----------------------------|----|-----------|-----------------------------|----|
| No. | Course | QH | No. | Course | QH |
| COM 1130 | Comp Org & Prog 1 | 4 | COM 1114 | C. Lab. | 1 |
| MTH 1223 | Calculus 4 | 4 | COM 1131 | Comp Org & Prog 2 | 4 |
| PHY 1231 | Physics 1 | 4 | MTH 1237 | Discr. Math 2 | 4 |
| PHY 1521 | Phys Lab 1 | 1 | PHY 1232 | Physics 2 | 4 |
| | Subarea or general elect. 2 | 4 | PHY 1522 | Phys. Lab. 2 | 1 |
| | | | | Subarea or general elect. 3 | 4 |

Third Year

| Quarter 6 | | | Quarter 7 | | |
|-----------|-----------------------------|----|-----------|-----------------------------|----|
| No. | Course | QH | No. | Course | QH |
| COM 1330 | Systems Prog.* | 4 | COM 1102 | Func. Prog. & Appl. | 4 |
| ECE 1229 | Digital Sys. Lab | 1 | COM 1350 | Automata & Formal Lang.* | 4 |
| ECE 1382 | Computer Engr. | 4 | ENG 1125 | Tech. Writing | 4 |
| PHY 1233 | Physics 3 | 4 | | Subarea or general elect. 5 | 4 |
| | Subarea or general elect. 4 | 4 | | | |

Fourth Year

| Quarter 8 | | | Quarter 9 | | |
|-----------|---------------------|----|-----------|-----------------------------|----|
| No. | Course | QH | No. | Course | QH |
| COM 1310 | File Structures* | 4 | COM 1205 | Software Des.* | 4 |
| MTH 1301 | Linear Algebra | 4 | MTH 1387 | Probability | 4 |
| SOC 1485 | Computers & Soc. | 4 | | Comp. Sci. Elect. 2 | 4 |
| | Comp. Sci. Elect. 1 | 4 | | Subarea or general elect. 6 | 4 |

Fifth Year

| Quarter 10 | | | Quarter 11 | | |
|------------|-----------------------------|----|------------|------------------------------|----|
| No. | Course | QH | No. | Course | QH |
| | Comp. Sci. Elect. 3 | 4 | COM 1621 | Senior Seminar | 1 |
| | Comp. Sci. Elect. 4 | 4 | | Comp. Sci. Elect. 5 | 4 |
| | Subarea or general elect. 7 | 4 | | Subarea or general elect. 9 | 4 |
| | Subarea or general elect. 8 | 4 | | Subarea or general elect. 10 | 4 |
| | | | | Subarea or general elect. 11 | 4 |

*COM 1330 in quarter 6 may be switched with COM 1310 in quarter 8. COM 1350 in quarter 7 may be switched with COM 1205 in quarter 9.

Specimen Program for the Four-Year Computer Science BS Program

First Year

| Quarter 1 | | | Quarter 2 | | | Quarter 3 | | |
|-----------|-------------------|----|-----------|--------------------|----|-----------|---------------------------|----|
| No. | Course | QH | No. | Course | QH | No. | Course | QH |
| COM 1100 | Fund of CS | 4 | COM 1101 | Alg. & Data Str. 1 | 4 | COM 1110 | FORTTRAN Lab | 1 |
| COM 1121 | CS Overview 1 | 1 | COM 1122 | CS Overview 2 | 1 | COM 1201 | Alg. & Data Str. 2 | 4 |
| ENG 1110 | Fresh. Eng. 1 | 4 | MTH 1124 | Calculus 2 | 4 | ENG 1111 | Fresh. Eng. 2 | 4 |
| MTH 1123 | Calculus 1 | 4 | MTH 1137 | Discr. Math 1 | 4 | MTH 1125 | Calculus 3 | 4 |
| _____ | Basic Soc. Sci. 1 | 4 | _____ | Basic Soc. Sci. 2 | 4 | _____ | Subarea or gen'l elect. 1 | 4 |

Second Year

| Quarter 4 | | | Quarter 5 | | |
|-----------|---------------------------|----|-----------|---------------------------|----|
| No. | Course | QH | No. | Course | QH |
| COM 1130 | Comp Org 1 | 4 | COM 1131 | Comp Org. & Prog. 2 | 4 |
| MTH 1223 | Calculus 4 | 4 | MTH 1237 | Discr. Math 2 | 4 |
| PHY 1231 | Physics 1 | 4 | PHY 1232 | Physics 2 | 4 |
| PHY 1521 | Phys. Lab 1 | 1 | PHY 1522 | Phys. Lab 2 | 1 |
| _____ | Subarea or gen'l elect. 2 | 4 | _____ | Subarea or gen'l elect. 3 | 4 |

Third Year

| Quarter 6 | | | Quarter 7 | | |
|-----------|---------------------------|----|-----------|---------------------------|----|
| No. | Course | QH | No. | Course | QH |
| COM 1114 | C. Lab. | 1 | COM 1330 | Systems Prog.* | 4 |
| COM 1350 | Automata & Formal Lang. | 4 | ECE 1382 | Computer Eng. | 4 |
| MTH 1387 | Probability | 4 | ECE 1229 | Digital Sys. Lab | 1 |
| _____ | Subarea or gen'l elect. 4 | 4 | PHY 1233 | Physics 3 | 4 |
| _____ | Subarea or gen'l elect. 5 | 4 | _____ | Subarea or gen'l elect. 6 | 4 |

Fourth Year

| Quarter 8 | | | Quarter 9 | | |
|-----------|---------------------------|----|-----------|---------------------------|----|
| No. | Course | QH | No. | Course | QH |
| COM 1102 | Func. Prog. & Appl. | 4 | COM 1205 | Software Design | 4 |
| ENG 1125 | Tech. Writing | 4 | MTH 1301 | Linear Algebra | 4 |
| _____ | Comp. Sci. Elect. 1 | 4 | _____ | Comp. Sci. Elect. 2 | 4 |
| _____ | Subarea or gen'l elect. 7 | 4 | _____ | Subarea or gen'l elect. 8 | 4 |

Fifth Year

| Quarter 10 | | | Quarter 11 | | |
|------------|---------------------------|----|------------|----------------------------|----|
| No. | Course | QH | No. | Course | QH |
| COM 1310 | File Structures* | 4 | COM 1621 | Senior Seminar | 1 |
| SOC 1485 | Computers & Soc. | 4 | _____ | Comp. Sci. Elect. 4 | 4 |
| _____ | Comp. Sci. Elect. 3 | 4 | _____ | Comp. Sci. Elect. 5 | 4 |
| _____ | Subarea or gen'l elect. 9 | 4 | _____ | Subarea or gen'l elect. 10 | 4 |
| | | | _____ | Subarea or gen'l elect. 11 | 4 |

*COM 1330 in quarter 7 may be switched with COM 1310 in quarter 10.

Note: The co-op assignments for this four-year program are as follows.

Six month: Summer and fall quarters following freshman year.

Three month: Winter of junior year.

Three month: Winter of senior year.

Computer Science Major Requirements

Computer Science

| Level 1 | | |
|----------|----------------------|----|
| No. | Course | QH |
| COM 1100 | Fund. Comp. Sci. | 4 |
| COM 1101 | Alg. & Data Str. 1 | 4 |
| COM 1102 | Funct. Prog. & Appl. | 4 |
| COM 1110 | FORTRAN Lab | 1 |
| COM 1114 | C Lang. Lab | 1 |
| COM 1121 | CS Overview 1 | 1 |
| COM 1122 | CS Overview 2 | 1 |
| COM 1130 | Comp Org & Prog 1 | 4 |
| COM 1131 | Comp Org & Prog 2 | 4 |
| COM 1201 | Alg. & Data Str. 2 | 4 |
| COM 1205 | Software Design | |

Level 2 (select eight courses, including the first course in each track and at least one complete track)

| No. | Course | QH |
|------------------------|------------------------|----|
| Database Track | | |
| COM 1310 | File Structures | 4 |
| COM 1315 | Database Mgmt. 1 | 4 |
| COM 1316 | Database Mgmt. 2 | 4 |
| Systems Track | | |
| COM 1330 | Systems Prog. | 4 |
| COM 1335 | Operating Systems 1 | 4 |
| COM 1336 | Operating Systems 2 | 4 |
| Languages Track | | |
| COM 1350 | Automata & Form. Lan. | 4 |
| COM 1355 | Compiler Design 1 | 4 |
| COM 1356 | Compiler Design 2 | 4 |
| Electives | | |
| COM 1358 | Anal. of Prog. Lang. | 4 |
| COM 1370 | Computer Graphics | 4 |
| COM 1390 | Anlys. of Algorithms | 4 |
| COM 1410 | Artificl. Intelligence | 4 |
| COM 1800 | Directed Study in CS | 4 |

Seminar (To be taken during senior year)
COM 1621 Computer Sci. Sem. 1

Mathematics

| Level 1 | | |
|----------|------------------|----|
| No. | Course | QH |
| MTH 1231 | Calculus 1 | 4 |
| MTH 1232 | Calculus 2 | 4 |
| MTH 1233 | Calculus 3 | 4 |
| MTH 1137 | Discrete Math. 1 | 4 |
| MTH 1223 | Calculus 4 | 4 |
| MTH 1237 | Discrete Math. 2 | 4 |

| Level 2 | | |
|----------|----------------|----|
| No. | Course | QH |
| MTH 1301 | Linear Algebra | 4 |
| MTH 1387 | Probability | 4 |

Physics

| Level 2 | | |
|----------|---------------|----|
| No. | Course | QH |
| PHY 1231 | Physics 1 | 4 |
| PHY 1232 | Physics 2 | 4 |
| PHY 1233 | Physics 3 | 4 |
| PHY 1521 | Physics Lab 1 | 1 |
| PHY 1522 | Physics Lab 2 | 1 |

Electrical Engineering

| Level 2 | | |
|----------|------------------|----|
| No. | Course | QH |
| ECE 1382 | Computer Engr. | 4 |
| ECE 1229 | Digital Sys. Lab | 1 |

English

| Level 1 | | |
|----------|-----------------|----|
| No. | Course | QH |
| ENG 1110 | Freshman Eng. 1 | 4 |
| ENG 1111 | Freshman Eng. 2 | 4 |

| Level 2 | | |
|----------|-------------------|----|
| No. | Course | QH |
| ENG 1125 | Technical Writing | 4 |

Social Science

| Level 1 | | |
|----------|-----------------------|----|
| No. | Course | QH |
| HST 1101 | Western Civ. 1 | 4 |
| HST 1102 | Western Civ. 2 | 4 |
| HST 1201 | U.S. to 1877 | 4 |
| HST 1202 | U.S. since 1877 | 4 |
| POL 1111 | American Gov. | 4 |
| POL 1112 | Intl. Relations | 4 |
| SOA 1104 | Cultures of the World | 4 |
| SOC 1121 | Doing Sociology | 4 |

| Level 2 | | |
|----------|------------------|----|
| No. | Course | QH |
| SOC 1485 | Computers & Soc. | 4 |

Other Subject Areas

| | |
|-----------------------|-------|
| Subarea Electives (5) | 20 QH |
| General Electives (6) | 24 QH |

Computer Science Requirements

Requirements for Computer Science Majors

Computer Science Courses

Computer Science courses fall into two levels. Level 1 consists of courses COM 1100, COM 1101, COM 1201, COM 1130, COM 1131, COM 1102, and COM 1205; labs COM 1110 and COM 1114; and overview courses COM 1121 and COM 1122. All other computer science courses are Level Two.

The Level 1 courses are all required.

Eight Level 2 courses must be taken, including the first course in each track and at least once complete track. The tracks are as follows:

- Database: COM 1310, COM 1315, COM 1316
Systems: COM 1330, COM 1335, COM 1336
Languages: COM 1350, COM 1355, COM 1356

Mathematics Courses

Majors must take the following eight mathematics courses: Level 1 Calculus MTH 1123, MTH 1124, MTH 1125, and MTH 1223; Discrete Mathematics MTH 1137, MTH 1237; Level 2 Probability MTH 1387; and Linear Algebra MTH 1301.

Physics Courses

Majors must take the following three courses: Physics PHY 1231, PHY 1232, and PHY 1233; and two labs: PHY 1521 and PHY 1522.

Electrical Engineering Courses

Majors must take the following two electrical engineering courses: ECE 1229, Digital Systems Lab and ECE 1382, Computer Engineering.

Other Subject Areas

Majors must take the following four courses: English ENG 1110 and ENG 1111; Technical Writing ENG 1125; Computers and Society SOC 1485. In addition, majors must take two basic social science courses which must be chosen from the following pairs: HST 1101 and HST 1102, *or* HST 1201 and HST 1202, *or* POL 1111 and POL 1112, *or* SOA 1104 and SOA 1121.

Majors must take at least five courses that form a subarea. The College of Computer Science will provide lists of suitable courses in a variety of subareas.

Majors have six free electives. However, at least two courses among the total eleven (five in the subarea and six general electives) must be in social sciences or humanities.

Requirements for Computer Science Minors

In addition to fulfilling the requirements of their major department, students who wish to minor in computer science must take the following four courses: COM 1100, COM 1101, COM 1130, COM 1201. They must also take three additional 4 QH courses with the COM prefix from those listed on this page.

Specimen Program for the Five-Year Computer Science BA Program

This curriculum applies to the classes of 1994 and 1995 with computer science courses starting in the first year.

First Year

| Quarter 1 | | | Quarter 2 | | | Quarter 3 | | |
|-----------|---------------|----|-----------|-------------------|----|-----------|-------------------|----|
| No. | Course | QH | No. | Course | QH | No. | Course | QH |
| COM 1100 | Fund. of CS | 4 | COM 1101 | Alg. & Data Str 1 | 4 | COM 1201 | Alg. & Data Str 2 | 4 |
| COM 1121 | CS Overview 1 | 1 | COM 1122 | CS Overview 2 | 1 | ENG 1111 | Fresh. Eng. 2 | 4 |
| ENG 1110 | Fresh. Eng. 1 | 4 | MTH 1124 | Calculus 2 | 4 | MTH 1125 | Calculus 3 | 4 |
| MTH 1123 | Calculus 1 | 4 | MTH 1137 | Discrete Math 1 | 4 | _____ | Gen. elective 1 | 4 |
| _____ | A & S Core 1 | 4 | _____ | A & S Core 2 | 4 | | | |

Second Year

| Quarter 4 | | | Quarter 5 | | |
|-----------|---------------------|----|-----------|---------------------|----|
| No. | Course | QH | No. | Course | QH |
| COM 1130 | Comp Org. & Prog. 1 | 4 | COM 1102 | Func. Prog. & Appl. | 4 |
| _____ | Gen. elective 2 | 4 | COM 1114 | C Lab | 1 |
| _____ | Science 1 | 4 | COM 1350 | Auto. & Frml. Lang. | 4 |
| _____ | A & S Core 3 | 4 | MTH 1237 | Discrete Math 2 | 4 |
| | | | _____ | Science 2 | 4 |

Third Year

| Quarter 6 | | | Quarter 7 | | |
|-----------|------------------|----|-----------|-------------------|----|
| No. | Course | QH | No. | Course | QH |
| COM 1390 | Anal. Algorithms | 4 | COM 1358 | Anal. Prog. Lang. | 4 |
| _____ | Gen. elective 2 | 4 | ENG _____ | MYWR* | 4 |
| _____ | Science 3 | 4 | _____ | A & S Core 5 | 4 |
| _____ | A & S Core 4 | 4 | _____ | A & S Core 6 | 4 |

Note: *MYWR is your middler year writing requirement course.

Fourth Year**Quarter 8**

| No. | Course | QH |
|----------|------------------------------|----|
| MTH 1301 | Linear Algebra | 4 |
| SOC 1485 | Computers & Soc. (Core 7) | 4 |
| _____ | CS elective 1 | 4 |
| _____ | A & S Core 8 | 4 |

Quarter 9

| No. | Course | QH |
|-------|-----------------|----|
| _____ | CS elective 2 | 4 |
| _____ | Gen. elective 4 | 4 |
| _____ | A & S Core 9 | 4 |
| _____ | A & S Core 10 | 4 |

Fifth Year**Quarter 10**

| No. | Course | QH |
|-------|-----------------|----|
| _____ | CS elective 3 | 4 |
| _____ | Gen. elective 5 | 4 |
| _____ | Gen. elective 6 | 4 |
| _____ | A & S Core 11 | 4 |

Quarter 11

| No. | Course | QH |
|----------|-----------------|----|
| COM 1621 | Senior Seminar | 1 |
| _____ | CS elective 4 | 4 |
| _____ | Gen. elective 7 | 4 |
| _____ | Gen. elective 8 | 4 |
| _____ | A & S Core 12 | 4 |

Specimen Program for the Five-Year Computer Science BA Program

This curriculum applies to the classes of 1994 and 1995 with computer science courses starting in the second year.

First Year**Quarter 1**

| No. | Course | QH |
|----------|---------------|----|
| ENG 1110 | Fresh. Eng. 1 | 4 |
| MTH 1123 | Calculus 1 | 4 |
| _____ | Science 1 | 4 |
| _____ | A & S Core 1 | 4 |

Quarter 2

| No. | Course | QH |
|----------|-----------------|----|
| MTH 1124 | Calculus 2 | 4 |
| _____ | Gen. elective 1 | 4 |
| _____ | Science 2 | 4 |
| _____ | A & S Core 2 | 4 |

Quarter 3

| No. | Course | QH |
|----------|-----------------|----|
| ENG 1111 | Fresh. Eng. 2 | 4 |
| MTH 1125 | Calculus 3 | 4 |
| _____ | Gen. elective 1 | 4 |
| _____ | Science 3 | 4 |

Second Year**Quarter 4**

| No. | Course | QH |
|----------|-----------------|----|
| COM 1100 | Fund. of CS | 4 |
| COM 1121 | CS Overview 1 | 1 |
| MTH 1137 | Discrete Math 1 | 4 |
| _____ | A & S Core 3 | 4 |
| _____ | A & S Core 4 | 4 |

Quarter 5

| No. | Course | QH |
|----------|--------------------|----|
| COM 1101 | Alg. & Data Str. 1 | 4 |
| COM 1222 | CS Overview 2 | 1 |
| MTH 1237 | Discrete Math 2 | 4 |
| _____ | A & S Core 5 | 4 |
| _____ | A & S Core 6 | 4 |

Third Year**Quarter 6**

| No. | Course | QH |
|----------|--------------------|----|
| COM 1201 | Alg. & Data Str. 2 | 4 |
| COM 1130 | Computer Org. 1 | 4 |
| _____ | Gen. elective 2 | 4 |
| _____ | A & S Core 7 | 4 |

Quarter 7

| No. | Course | QH |
|-----------|---------------------|----|
| COM 1102 | Func. Prog. & Appl. | 4 |
| COM 1114 | C Lab | 1 |
| COM 1350 | Auto. & Frml. Lang | 4 |
| ENG _____ | MYWR* | 4 |
| _____ | A & S Core 8 | 4 |

Fourth Year**Quarter 8**

| No. | Course | QH |
|----------|------------------------------|----|
| COM 1390 | Anal. Algorithms | 4 |
| MTH 1301 | Linear Algebra | 4 |
| SOC 1485 | Computers & Soc. (Core 9) | 4 |
| _____ | Gen. elective 4 | 4 |

Quarter 9

| No. | Course | QH |
|----------|-------------------|----|
| COM 1358 | Anal. Prog. Lang. | 4 |
| _____ | CS elective 1 | 4 |
| _____ | Gen. elective 5 | 4 |
| _____ | A & S Core 10 | 4 |

Fifth Year**Quarter 10**

| No. | Course | QH |
|-------|-----------------|----|
| _____ | CS elective 2 | 4 |
| _____ | CS elective 3 | 4 |
| _____ | Gen. elective 6 | 4 |
| _____ | A & S Core 11 | 4 |

Quarter 11

| No. | Course | QH |
|----------|-----------------|----|
| COM 1621 | Senior Seminar | 1 |
| _____ | CS elective 4 | 4 |
| _____ | Gen. elective 7 | 4 |
| _____ | Gen. elective 8 | 4 |
| _____ | A & S Core 12 | 4 |

Note: *MYWR is your middler year writing requirement course.

Specimen Program for the Four-Year Computer Science BA Program

This curriculum applies to the classes of 1993 and 1994.

First Year

Quarter 1

| No. | Course | QH |
|----------|---------------|----|
| COM 1100 | Fund. of CS | 4 |
| COM 1121 | CS Overview 1 | 1 |
| ENG 1110 | Fresh. Eng. 1 | 4 |
| MTH 1123 | Calculus 1 | 4 |
| _____ | A & S Core 1 | 4 |

Quarter 2

| No. | Course | QH |
|----------|--------------------|----|
| COM 1101 | Alg. & Data Str. 1 | 4 |
| COM 1122 | CS Overview 2 | 1 |
| MTH 1124 | Calculus 2 | 4 |
| MTH 1137 | Discrete Math 1 | 4 |
| _____ | A & S Core 2 | 4 |

Quarter 3

| No. | Course | QH |
|----------|--------------------|----|
| COM 1201 | Alg. & Data Str. 2 | 4 |
| ENG 1111 | Fresh. Eng. 2 | 4 |
| MTH 1125 | Calculus 3 | 4 |
| _____ | Gen. elective 1 | 4 |

Second Year

Quarter 4

| No. | Course | QH |
|----------|----------------------|----|
| COM 1130 | Comp. Org. & Prog. 1 | 4 |
| _____ | Science 1 | 4 |
| _____ | A & S Core 3 | 4 |
| _____ | A & S Core 4 | 4 |

Quarter 5

| No. | Course | QH |
|----------|---------------------|----|
| COM 1102 | Func. Prog. & Appl. | 4 |
| COM 1114 | C Lab | 1 |
| COM 1350 | Auto. & Frml. Lang. | 4 |
| MTH 1237 | Discrete Math 2 | 4 |
| _____ | Science 2 | 4 |

Quarter 6

| No. | Course | QH |
|----------|------------------|----|
| COM 1390 | Anal. Algorithms | 4 |
| _____ | Gen. elective 2 | 4 |
| _____ | A & S Core 5 | 4 |
| _____ | A & S Core 6 | 4 |

Third Year

Quarter 7

| No. | Course | QH |
|----------|------------------------------|----|
| COM 1358 | Anal. Prog. Lang. | 4 |
| MTH 1301 | Linear Algebra | 4 |
| SOC 1485 | Computers & Soc. (Core 7) | 4 |
| _____ | Science 3 | 4 |

Quarter 8

| No. | Course | QH |
|-----------|-----------------|----|
| _____ | CS elective 1 | 4 |
| ENG _____ | MYWR* | 4 |
| _____ | Gen. elective 3 | 4 |
| _____ | A & S Core 8 | 4 |

Quarter 9

| No. | Course | QH |
|-------|-----------------|----|
| _____ | CS elective 2 | 4 |
| _____ | Gen. elective 4 | 4 |
| _____ | A & S Core 9 | 4 |
| _____ | A & S Core 10 | 4 |

Fourth Year

Quarter 10

| No. | Course | QH |
|-------|-----------------|----|
| _____ | CS elective 3 | 4 |
| _____ | Gen. elective 5 | 4 |
| _____ | Gen. elective 6 | 4 |
| _____ | A & S Core 11 | 4 |

Quarter 11

| No. | Course | QH |
|-------|-----------------|----|
| _____ | Senior Seminar | 1 |
| _____ | CS elective 4 | 4 |
| _____ | Gen. elective 7 | 4 |
| _____ | Gen. elective 8 | 4 |
| _____ | A & S Core 12 | 4 |

Note: *MYWR is your middler year writing requirement course.

Note: The co-op assignments for this program are as follows.

Six-month assignment: Summer and fall quarters following first year.

Three-month assignment: Winter of third year.

Three-month assignment: Winter of fourth year.

College of Criminal Justice

Specimen Program in Criminal Justice

First Year

Quarter 1

| No. | Course | QH |
|----------|--------------------|----|
| CJ 1101 | Admin. Crim. Just. | 4 |
| POL 1110 | Intro. Politics | 4 |
| PSY 1111 | Fnd. Psych. 1 | 4 |
| HST 1101 | Western Civ. 1 | 4 |

Quarter 2

| No. | Course | QH |
|----------|-------------------|----|
| CJ 1112 | Iss. C.J. & Crim. | 4 |
| ENG 1110 | Fresh. Eng. 1 | 4 |
| HST 1102 | Western Civ. 2 | 4 |
| POL 1111 | Intro. Amer. Gov. | 4 |

Quarter 3

| No. | Course | QH |
|----------|--------------------|----|
| CJ 1151 | Law & Legl. Pro. 1 | 4 |
| ENG 1111 | Fresh. Eng. 2 | 4 |
| PSY 1112 | Fnd. Psych. 2 | 4 |
| SOC 1100 | Intro. Soc. | 4 |

Second Year

Quarter 4

| No. | Course | QH |
|----------|--------------------|----|
| CJ 1201 | Criminology | 4 |
| CJ 1251 | Crim. Law | 4 |
| POL 1318 | State & Loc. Gov. | 4 |
| _____ | Math/Sci. Require. | 4 |

Quarter 5

| No. | Course | QH |
|----------|-----------------------|----|
| CJ _____ | Crim. Jus. Elctv. | 4 |
| CJ 1252 | Crim. Due Proc. | 4 |
| _____ | Math/Sci. Require. | 4 |
| _____ | Non-Crim. Jus. Elctv. | 4 |

Third Year**Quarter 6**

| No. | Course | QH |
|----------|-------------------|----|
| CJ 1451 | Crim. Jus. Res. | 4 |
| CJ _____ | Crim. Jus. Elctv. | 4 |
| ECN 1115 | Prin. Macroecon. | 4 |
| ENG 1350 | Intrmdte. Writing | 4 |

Quarter 7

| No. | Course | QH |
|----------|-----------------------|----|
| CJ _____ | Crim. Jus. Elctv. | 4 |
| ECN 1116 | Prin. Microecon. | 4 |
| _____ | Non-Crim. Jus. Elctv. | 4 |
| _____ | Non-Crim. Jus. Elctv. | 4 |

Fourth Year**Fifth Year****Quarters 8-11**

| No. | Course | QH |
|----------|-----------------------|----|
| CJ _____ | Crim. Jus. Elctv. | 24 |
| _____ | Non-Crim. Jus. Elctv. | 36 |

College of Engineering

Specimen Program in Chemical Engineering

All courses in chemical engineering must be taken in sequence shown.

First Year**Quarter 1**

| No. | Course | QH |
|----------|---------------------|----|
| ENG 1111 | Fresh. Eng. 2 | 4 |
| GE 1100 | Comp. for Engr. | 4 |
| MTH 1123 | Calculus 1 | 4 |
| PHY 1221 | Physics for Engr. 1 | 4 |
| PHY 1521 | Physics Lab Engr. 1 | 1 |

Quarter 2

| No. | Course | QH |
|----------|-----------------------|----|
| CHM 1131 | Gen. Chem. | 4 |
| GE 1110 | Engr. Graph. and Des. | 4 |
| MTH 1124 | Calculus 2 | 4 |
| PHY 1222 | Physics for Engr. 2 | 4 |
| PHY 1522 | Physics Lab Engr. 2 | 1 |

Quarter 3

| No. | Course | QH |
|----------|---------------------|----|
| CHM 1132 | Gen. Chem. | 4 |
| CHM 1138 | Chem. Lab | 1 |
| ENG 1113 | Gr. Th. Lit. | 4 |
| MTH 1125 | Calculus 3 | 4 |
| PHY 1223 | Physics for Engr. 3 | 4 |

Second Year**Quarter 4**

| No. | Course | QH |
|----------|----------------------|----|
| CHE 1201 | Chm. Engr. Cln. 1 | 4 |
| CHE 1205 | Computation Lab | 2 |
| CHM 1271 | Organic Chem. 1 | 3 |
| MTH 1223 | Calculus 4 | 4 |
| _____ | Soc. Sc./Hm. Elctv.* | 4 |

Quarter 5

| No. | Course | QH |
|----------|----------------------|----|
| CHE 1202 | Chem. Engr. Cln. 2 | 4 |
| CHM 1272 | Org. Chm. 2 (& Lab) | 5 |
| MTH 1225 | Math Analysis 1 | 4 |
| _____ | Soc. Sc./Hm. Elctv.* | 4 |

Third Year**Quarter 6**

| No. | Course | QH |
|----------|----------------------|----|
| CHE 1211 | Chm. Engr. Therm. 1 | 4 |
| CHM 1381 | Phys. Chem. 1 | 3 |
| CHM 1394 | Exp. Phys. Chem. 1 | 2 |
| MTH 1230 | Linear Algebra | 4 |
| _____ | Soc. Sc./Hm. Elctv.* | 4 |

Quarter 7

| No. | Course | QH |
|----------|----------------------|----|
| CHE 1310 | Chm. Engr. Therm. 2 | 4 |
| CHE 1320 | Momentum Trnsprt. | 4 |
| CHM 1382 | Phys. Chem. 2 | 3 |
| CHM 1395 | Exp. Phys. Chem. 2 * | 2 |
| ENG 1125 | Technical Writing 1 | 4 |

Fourth Year**Quarter 8**

| No. | Course | QH |
|----------|-------------------|----|
| CHE 1410 | Exp. Methods 1 | 4 |
| CHE 1421 | Chm. Engr. Kintc. | 4 |
| CHE 1430 | Heat Transport. | 4 |
| ECN 1115 | Economics 1 | 4 |

Quarter 9

| No. | Course | QH |
|----------|----------------------|----|
| CHE 1411 | Exp. Methods 2 | 4 |
| CHE 1440 | Separation Procs. | 4 |
| CHE 1450 | Chem. Engr. Econ. | 4 |
| _____ | Soc. Sc./Hm. Elctv.* | 4 |

Fifth Year**Quarter 10†**

| No. | Course | QH |
|-----------|---------------------|----|
| CHE 1501 | Process Design 1 | 6 |
| CHE 1512 | Process Control | 4 |
| CHE _____ | Chem. Engr. Elctv.* | 4 |
| _____ | Adv. Chem. Elctv.* | 4 |

Quarter 11† (Spring only)

| No. | Course | QH |
|-----------|---------------------|----|
| CHE 1502 | Process Design 2 | 6 |
| CHE _____ | Chem. Engr. Elctv.* | 4 |
| CHE _____ | Chem. Engr. Elctv.* | 4 |
| _____ | Engr. Elctv.* | 4 |

Quarters 4, 6, 8, and 10 offered fall and winter. Quarters 5, 7, and 9 offered spring and summer.

*From lists of approved electives, taken quarter 10 or 11 as offered.

†Quarters 10 and 11 must be approved by department adviser.

All elective courses must satisfy departmental design, engineering science, and social science/humanities requirements.

Specimen Program in Civil Engineering

First Year

| Quarter 1 | | | Quarter 2 | | | Quarter 3 | | |
|-----------|-------------------------|----|-----------|-------------------------|----|-----------|--------------|----|
| No. | Course | QH | No. | Course | QH | No. | Course | QH |
| ENG 1111 | Fresh. Engr. 2 | 4 | CHM 1131 | Gen. Chem. 1 | 4 | COM 1110 | FORTTRAN Lab | 1 |
| GE 1100 | Comp. for Engr. | 4 | GE 1110 | Engr. Graph. & Des. | 4 | CHM 1132 | Gen. Chem. 2 | 4 |
| MTH 1123 | Calculus 1 | 4 | MTH 1124 | Calculus 2 | 4 | ENG 1113 | Gr. Th. Lit. | 4 |
| PHY 1221 | Physics 1 | 4 | PHY 1222 | Physics 2 | 4 | MTH 1125 | Calculus 3 | 4 |
| PHY 1521 | Physics Lab for Engr. 1 | 1 | PHY 1522 | Physics Lab for Engr. 2 | 1 | PHY 1223 | Physics 3 | 4 |

Second Year

| Quarter 4 | | | Quarter 5 | | |
|-----------|-----------------|----|-----------|---------------------|----|
| No. | Course | QH | No. | Course | QH |
| CIV 1210 | Struct. Mech. 1 | 4 | CIV 1211 | Struct. Mech. 2 | 4 |
| CIV 1510 | Materials | 4 | CIV 1620 | Engr. Meas. | 4 |
| CIV 1511 | Materials Lab | 2 | CIV 1621 | Engr. Meas. Lab | 2 |
| MTH 1223 | Calculus 4 | 4 | ECN 1116 | Prin. of Microecon. | 4 |
| | Soc Sc/Hm Elect | 4 | MTH 1225 | Math. Analysis 1 | 4 |

Third Year

| Quarter 6 | | | Quarter 7 | | |
|-----------|--------------------|----|-----------|---------------------|----|
| No. | Course | QH | No. | Course | QH |
| CIV 1220 | Struc. Anal. 1 | 4 | CIV 1240 | Concrete Des. 1 | 4 |
| CIV 1226 | St. An. & Ds. Lab | 2 | CIV 1340 | Environ. Engr. 1 | 4 |
| CIV 1310 | Fluid Mech. | 4 | CIV 1410 | Soil Mechanics | 4 |
| MTH 1230 | Linear Algebra | 4 | CIV 1411 | Soil Mech. Lab | 2 |
| | Soc. Sc/Hm. Elctv. | 4 | ENG 1125 | Technical Writing 1 | 4 |

Fourth Year

| Quarter 8 | | | Quarter 9 | | |
|-----------|---------------------|----|-----------|-------------------|----|
| No. | Course | QH | No. | Course | QH |
| CIV 1250 | Des. Steel Struc. 1 | 4 | CIV 1665 | Prof. Issues | 1 |
| CIV 1625 | C.E. Computer Lab | 1 | IIS 1366 | Engr. Economy | 4 |
| CIV 1640 | Applied Probability | 4 | ME 1320 | Dynamics for C.E. | 4 |
| | Tech. Elective | 4 | | Tech. Elective | 4 |
| | Tech. Elective | 4 | | Tech. Elective | 4 |

Fifth Year

| Quarter 10 | | | Quarter 11 | | |
|------------|-------------------|----|------------|-------------------|----|
| No. | Course | QH | No. | Course | QH |
| | Tech. Elective | 4 | | Gen. Elective* | 4 |
| | Tech. Elective | 4 | | Tech. Elective | 4 |
| | Soc. Sc./Hum. | 4 | | Tech. or Capstone | 4 |
| | Elective | | | Elective | |
| | Tech. or Capstone | 4 | | Soc. Sc./Hum. | 4 |
| | Elective | | | Elective | |

*This may be a technical or arts and sciences elective or any other 4 QH course given at the University. The general elective may be interchanged with an arts and sciences elective in another quarter, with the approval of the civil engineering department.

During quarter 11 you must enroll in *one* of four capstone electives which will be offered by the civil engineering department. You will have to use some of your technical electives to fulfill prerequisites for the capstone. Make your selections as follows.

| Area | Quarter 8 | Quarter 9 | Quarter 10 | Quarter 11 |
|----------------|-----------|----------------------|------------|------------|
| Environmental | CIV 1320 | CIV 1341 | CIV 1350 | Capstone |
| Structures | CIV 1241 | CIV 1251 CIV 1222 | Capstone | |
| Transportation | CIV 1540 | CIV 1630 | CIV 1530 | Capstone |
| Geotechnical | | CIV 1420 | CIV 1550 | Capstone |

Your remaining technical electives must include a minimum of 11 design credits.

Students must select the capstone, eight technical, and four social science/humanities electives from the approved lists available in Student Services, 220 Snell Engineering Center or in the civil engineering department office, 420 Snell Engineering Center.

Important Note Regarding Technical Electives

The capstone elective that you choose will have a number of prerequisites that are technical electives. Plan your technical elective selections carefully, *prior to quarter 8*, to insure that you will have acquired the specific prerequisites for your preferred capstone elective.

Specimen Program for the Part-Time Evening Civil Engineering BS Program

First Year

Fall Quarter

| No. | Course | QH |
|----------|-----------------|----|
| GE 1100 | Comp. for Engr. | 4 |
| MTH 1123 | Calculus 1 | 4 |

Winter Quarter

| No. | Course | QH |
|----------|--------------|----|
| CHM 1131 | Chemistry 1 | 4 |
| COM 1110 | FORTTRAN Lab | 1 |
| MTH 1124 | Calculus 2 | 4 |

Spring Quarter

| No. | Course | QH |
|----------|-------------|----|
| CHM 1132 | Chemistry 2 | 4 |
| MTH 1125 | Calculus 3 | 4 |

Second Year

Fall Quarter

| No. | Course | QH |
|----------|-------------------------|----|
| MTH 1223 | Calculus 4 | 4 |
| PHY 1221 | Physics 1 | 4 |
| PHY 1521 | Physics Lab for Engr. 1 | 1 |

Winter Quarter

| No. | Course | QH |
|----------|-------------------------|----|
| MTH 1225 | Math Analysis 1 | 4 |
| PHY 1222 | Physics 2 | 4 |
| PHY 1522 | Physics Lab for Engr. 2 | 1 |

Spring Quarter

| No. | Course | QH |
|----------|---------------------|----|
| GE 1110 | Engr. Graph. & Des. | 4 |
| PHY 1223 | Physics 3 | 4 |

Third Year

Fall Quarter

| No. | Course | QH |
|----------|-----------------|----|
| CIV 1210 | Struct. Mech. 1 | 4 |
| CIV 1620 | Engr. Meas. | 4 |

Winter Quarter

| No. | Course | QH |
|----------|-----------------|----|
| CIV 1211 | Struct. Mech. 2 | 4 |
| MTH 1230 | Linear Algebra | 4 |

Spring Quarter

| No. | Course | QH |
|----------|-------------------|----|
| CIV 1410 | Soil Mechanics | 4 |
| CIV 1411 | Soil Mech. Lab | 2 |
| ENG 1125 | Technical Writing | 4 |

Fourth Year

Fall Quarter

| No. | Course | QH |
|----------|--------------------|----|
| CIV 1220 | Struct. Anal. 1 | 4 |
| CIV 1226 | St. An. & Ds. Lab* | 2 |
| CIV 1310 | Fluid Mech. | 4 |

Winter Quarter

| No. | Course | QH |
|----------|------------------|----|
| CIV 1240 | Concrete Des. 1 | 4 |
| CIV 1340 | Environ. Engr. 1 | 4 |

Spring Quarter

| No. | Course | QH |
|----------|---------------------|----|
| CIV 1250 | Des. Steel Struc. 1 | 4 |
| CIV 1625 | CE Computer Lab | 1 |
| CIV 1640 | Applied Probability | 4 |

Fifth Year†

Fall Quarter

| No. | Course | QH |
|----------|---------------------------------|----|
| CIV 1241 | Concrete Des. 2 ^s or | 4 |
| CIV 1341 | Environ. Engr. 2 ^s | 4 |
| | General Elective | 4 |

Winter Quarter

| No. | Course | QH |
|----------|---------------|----|
| IIS 1366 | Engr. Economy | 4 |
| ME 1320 | Dynamics | 4 |

Spring Quarter

| No. | Course | QH |
|----------|--------------------------------|----|
| CIV 1510 | Materials | 4 |
| CIV 1511 | Materials Lab† | 2 |
| CIV 1540 | Highway Engr. or ^s | 4 |
| CIV 1550 | Construction Mgt. ^s | 4 |

Sixth Year (Odd)†

Fall Quarter

| No. | Course | QH |
|----------|-------------------------------|----|
| CIV 1341 | Environ. Engr. 2 ^s | 4 |
| CIV 1420 | Foundation Engr. ^s | 4 |

Winter Quarter

| No. | Course | QH |
|----------|--------------------------------|----|
| CIV 1320 | Hydraulic Engr. ^s | 4 |
| CIV 1350 | Environ./Hyd. Lab ^s | 4 |

Spring Quarter

| No. | Course | QH |
|----------|-----------------------------------|----|
| CIV 1395 | Environ. Des. Proj. | 4 |
| CIV 1540 | Highway Engr. ^s | 4 |

Sixth Year (Even)

Fall Quarter

| No. | Course | QH |
|----------|-------------------------------|----|
| CIV 1241 | Concrete Des. 2 ^s | 4 |
| CIV 1420 | Foundation Engr. ^s | 4 |

Winter Quarter

| No. | Course | QH |
|----------|----------------------------------|----|
| CIV 1222 | Struct. Anal. 2 ^s | 4 |
| CIV 1251 | Des. Steel Struc. 2 ^s | 4 |

Spring Quarter

| No. | Course | QH |
|----------|----------------------------------|----|
| CIV 1295 | Struct. Des. Proj. | 4 |
| CIV 1550 | Construction Mgt. ^s | 4 |

Students must also take the following required courses, available during the summer quarter, plus five adviser-approved 4 QH social science/humanities electives for a total of eight courses in this subject area: ENG 1111, Freshman English 1; ENG 1113, Great Themes in Literature; and ECN 1116, Microeconomics.

*Offered even years only (for example, fall 1994 of the 1994–1995 academic year).

†Offered odd years only (for example, spring 1996 of the 1995–1996 academic year).

^sYear six courses may be taken before year five. During years five/six students must take seven technical electives, designated here by ^s. These electives must supply a minimum of eleven design credits. Select year five/six order based on course offering preference. "Odd" refers to academic years beginning fall 1991. "Even" refers to academic years beginning fall 1990.

^{||}Students must take one capstone design projects course, designated by ^{||}.

Specimen Program in Computer Engineering

First Year

Quarter 1

| No. | Course | QH |
|----------|-----------------------|----|
| ENG 1111 | Fresh. Eng. 2 | 4 |
| GE 1100 | Computers for Eng'g. | 4 |
| MTH 1123 | Calculus 1 | 4 |
| PHY 1221 | Physics 1 | 4 |
| PHY 1521 | Physics Lab for Eng 1 | 1 |

Quarter 2

| No. | Course | QH |
|----------|-----------------------|----|
| CHM 1131 | Chem. 1 | 4 |
| GE 1110 | Eng'g. Graph. & Des. | 4 |
| MTH 1124 | Calculus 2 | 4 |
| PHY 1222 | Physics 2 | 4 |
| PHY 1522 | Physics Lab for Eng 2 | 1 |

Quarter 3

| No. | Course | QH |
|----------|--------------|----|
| CHM 1132 | Chem. 2 | 4 |
| COM 1110 | FORTRAN Lab | 1 |
| ENG 1113 | Gr. Th. Lit. | 4 |
| MTH 1125 | Calculus 3 | 4 |
| PHY 1223 | Physics 3 | 4 |

Second Year

Quarter 4

| No. | Course | QH |
|----------|----------------------|----|
| ECE 1215 | Circuits & Systems 1 | 4 |
| ECE 1221 | Measure Lab | 1 |
| MTH 1223 | Calculus 4 | 4 |
| PHY 1224 | Physics 4 | 4 |
| | Soc. Sc./Hm. Elctv. | 4 |

Quarter 5

| No. | Course | QH |
|----------|----------------------|----|
| ECE 1216 | Circuits & Systems 2 | 4 |
| ECE 1222 | Circuit Lab 1 | 1 |
| ME 1321 | Mechanics for E.E. | 4 |
| MTH 1225 | Math Analysis 1 | 4 |
| | Soc. Sc./Hm. Elctv. | 4 |

Third Year

Quarter 6

| No. | Course | QH |
|----------|----------------------|----|
| ECE 1217 | Circuits & Systems 3 | 4 |
| ECE 1223 | Circuit Lab 2 | 1 |
| ECE 1346 | Electronics 1 | 4 |
| ECE 1381 | Comp. Eng'g. 1 | 4 |
| ME 1340 | Thermodynamics or. | 4 |
| ME 1386 | Material Science | 4 |

Quarter 7

| No. | Course | QH |
|----------|-------------------|----|
| ECE 1224 | Electr. Lab 1 | 1 |
| ECE 1229 | Dig. Syst. Lab | 1 |
| ECE 1332 | Linear Sys. 1 | 4 |
| ECE 1347 | Electronics 2 | 4 |
| ECE 1382 | Computer Eng'g. 2 | 4 |
| ENG 1125 | Tech. Writing | 4 |

Fourth Year

Quarter 8

| No. | Course | QH |
|----------|---------------------------|----|
| ECE 1225 | Electr. Lab 2 | 1 |
| ECE 1226 | Discrete Sys. Lab | 1 |
| ECE 1333 | Linear Sys. 2 | 4 |
| ECE 1349 | Electr. Des. 1 | 4 |
| ECE 1363 | Electromag. Fld. Theory 1 | 4 |
| ECE 1383 | Comp. Eng'g. 3 | 4 |
| | Soc. Sc./Hm. Elctv. | 4 |

Quarter 9

| No. | Course | QH |
|----------|---------------------------|----|
| ECE 1227 | Electromag. Flds. Lab 1 | 1 |
| ECE 1364 | Electromag. Fld. Theory 2 | 4 |
| ECE 1384 | Comp. Eng'g. 4 | 4 |
| MTH 1384 | Probability | 4 |
| | Soc. Sc./Hm. Elctv. | 4 |

Fifth Year

Quarter 10

| No. | Course | QH |
|----------|-------------------------|----|
| ECE 1228 | Electromag. Flds. Lab 2 | 4 |
| ECE 1230 | VLSI Sys. Design Lab | 2 |
| ECE 1351 | Top. In. IC Des. | 4 |
| ECE 1365 | Flds. & En. Conv. | 4 |
| ECE 1454 | Comm. Systems | 4 |
| | Soc. Sci./Hum. Elect. | 4 |

Quarter 11

| No. | Course | QH |
|-----|------------------------|----|
| | Tech Elective | 4 |
| | Tech. Elective | 4 |
| | Tech. Elective | 4 |
| | Soc. Sc./Hum. Elective | 4 |

Quarters 4, 6, 8, and 10 offered fall and winter.
Quarters 5, 7, and 9 offered spring and summer.
All elective courses must satisfy departmental design, engineering science and social science/humanities requirements.

Specimen Program in Electrical Engineering

First Year

Quarter 1

| No. | Course | QH |
|----------|------------------------|----|
| ENG 1111 | Fresh. Eng. 2 | 4 |
| GE 1100 | Comp. for Engr. | 4 |
| MTH 1123 | Calculus 1 | 4 |
| PHY 1221 | Physics 1 | 4 |
| PHY 1521 | Physics Lab for Eng. 1 | 1 |

Quarter 2

| No. | Course | QH |
|----------|------------------------|----|
| CHM 1131 | Gen. Chem. 1 | 4 |
| GE 1110 | Engr. Graph. & Des. | 4 |
| MTH 1124 | Calculus 2 | 4 |
| PHY 1222 | Physics 2 | 4 |
| PHY 1522 | Physics Lab for Eng. 2 | 1 |

Quarter 3

| No. | Course | QH |
|----------|--------------|----|
| CHM 1132 | Gen. Chem. 2 | 4 |
| COM 1110 | FORTRAN Lab | 1 |
| ENG 1113 | Gr. Th. Lit. | 4 |
| MTH 1125 | Calculus 3 | 4 |
| PHY 1223 | Physics 3 | 4 |

Second Year

Quarter 4

| No. | Course | QH |
|----------|--------------------|----|
| ECE 1215 | Circ. & Sys. 1 | 4 |
| ECE 1221 | Measurements Lab | 1 |
| MTH 1223 | Calculus 4 | 4 |
| PHY 1224 | Physics 4 | 4 |
| | Soc. Sc./Hm. Elec. | 4 |

Quarter 5

| No. | Course | QH |
|----------|--------------------|----|
| ECE 1216 | Circ. & Sys. 2 | 4 |
| ECE 1222 | Circuit Lab 1 | 1 |
| ME 1321 | Mechanics for E.E. | 4 |
| MTH 1225 | Math Analysis 1 | 4 |
| | Soc. Sc./Hm. Elec. | 4 |

Third Year**Quarter 6**

| No. | Course | QH |
|----------|--------------------|----|
| ECE 1217 | Cir. & Sys. 3 | 4 |
| ECE 1346 | Electron. 1 | 4 |
| ECE 1381 | Comp. Eng'g. 1 | 4 |
| ME 1340 | Therm. 1 <i>or</i> | 4 |
| ECE 1223 | Circuits Lab 2 | 1 |
| ME 1386 | Materials Sci. | 4 |

Quarter 7

| No. | Course | QH |
|----------|-------------------|----|
| ECE 1224 | Electronics Lab 1 | 1 |
| ECE 1229 | Dig. Syst. Lab 1 | 1 |
| ECE 1332 | Linear Sys. 1 | 4 |
| ECE 1347 | Electron. 2 | 4 |
| ECE 1382 | Comp. Eng'g. 2 | 4 |
| ENG 1125 | Tech. Writing | 4 |

Fourth Year**Quarter 8**

| No. | Course | QH |
|----------|---------------------------|----|
| ECE 1225 | Electronics Lab 2 | 1 |
| ECE 1226 | Discrete Sys. Lab 1 | 1 |
| ECE 1333 | Linear Sys. 2 | 4 |
| ECE 1349 | Electronic Des. 1 | 4 |
| ECE 1363 | Electromag. Fld. Theory 1 | 4 |
| ECE 1383 | Comp. Eng'g. 3 | 4 |

Quarter 9

| No. | Course | QH |
|----------|----------------------------|----|
| ECE 1227 | Electromag. Flds. Lab 1 | 1 |
| ECE 1364 | Electromag. Flds. Theory 2 | 4 |
| MTH 1384 | Probability for E.E. | 4 |
| _____ | Soc. Sci./Hum. Elect. | 4 |
| _____ | Tech. Elective | 4 |

Fifth Year**Quarter 10**

| No. | Course | QH |
|----------|-------------------------|----|
| ECE 1228 | Electromag. Flds. Lab 2 | 1 |
| ECE 1365 | Flds. & En. Conv. | 4 |
| ECE 1454 | Comm. Systems | 4 |
| _____ | Soc. Sci./Hum. Elect. | 4 |
| _____ | Tech. Elective | 4 |

Quarter 11

| No. | Course | QH |
|----------|-----------------------------|----|
| ECE 1408 | Physical Electron <i>or</i> | 4 |
| ECE 1420 | Control Systems* <i>or</i> | 4 |
| ECE 1465 | Wave Trans. & Recept. | 4 |
| _____ | Soc. Sci./Hum. Elect. | 4 |
| _____ | Tech. Elective | 4 |
| _____ | Tech. Elective | 4 |

*Plus ECE 1235 Control Lab, 1 QH.

Specimen Program in Power Systems**First Year****Quarter 1**

| No. | Course | QH |
|----------|-------------------------|----|
| ENG 1111 | Fresh. Eng. 2 | 4 |
| GE 1100 | Comp. for Engr. | 4 |
| MTH 1123 | Calculus 1 | 4 |
| PHY 1221 | Physics 1 | 4 |
| PHY 1521 | Physics Lab for Engr. 1 | 1 |

Quarter 2

| No. | Course | QH |
|----------|-------------------------|----|
| CHM 1131 | Gen. Chem. 1 | 4 |
| GE 1110 | Engr. Graph. & Des. | 4 |
| MTH 1124 | Calculus 2 | 4 |
| PHY 1222 | Physics 2 | 4 |
| PHY 1522 | Physics Lab for Engr. 2 | 1 |

Quarter 3

| No. | Course | QH |
|----------|--------------|----|
| CHM 1132 | Gen. Chem. | 4 |
| COM 1110 | FORTTRAN Lab | 1 |
| ENG 1113 | Gr. Th. Lit. | 4 |
| MTH 1125 | Calculus 3 | 4 |
| PHY 1223 | Physics 3 | 4 |

Second Year**Quarter 4**

| No. | Course | QH |
|----------|---------------------|----|
| ECE 1215 | Cir. & Systems 1 | 4 |
| ECE 1221 | Measurement Lab | 1 |
| MTH 1223 | Calculus 4 | 4 |
| PHY 1224 | Physics 4 | 4 |
| _____ | Soc. Sc./Hm. Elctv. | 4 |

Quarter 5

| No. | Course | QH |
|----------|---------------------|----|
| ECE 1216 | Cir. & Systems 2 | 4 |
| ECE 1222 | Circuit Lab | 1 |
| ME 1321 | Mechanics for E.E. | 4 |
| MTH 1225 | Math Analysis 1 | 4 |
| _____ | Soc. Sc./Hm. Elctv. | 4 |

Third Year**Quarter 6**

| No. | Course | QH |
|----------|---------------|----|
| ECE 1217 | Cir. & Sys. 3 | 4 |
| ECE 1223 | Circuit Lab 2 | 1 |
| ECE 1346 | Electron. 1 | 4 |
| ECE 1381 | Comp. Engr. 1 | 4 |
| ME 1360 | Thermo 1 | 5 |

Quarter 7

| No. | Course | QH |
|----------|-----------------|----|
| ECE 1224 | Electron. Lab 1 | 1 |
| ECE 1229 | Dis. Syst. Lab | 1 |
| ECE 1332 | Linear Sys. 1 | 4 |
| ECE 1347 | Electron. 2 | 4 |
| ECE 1382 | Comp. Engr. 2 | 4 |
| ENG 1125 | Tech. Writing | 4 |

Quarters 4 and 6 offered fall and winter.
Quarters 5 and 7 offered spring and summer.

Fourth Year**Quarter 8
(Fall Only)**

| No. | Course | QH |
|----------|---------------------|----|
| ECE 1225 | Electronics Lab 2 | 1 |
| ECE 1226 | Discrete Sys. Lab 1 | 1 |
| ECE 1333 | Linear Sys. 2 | 4 |
| ECE 1349 | Electronic Des. 1 | 4 |
| ECE 1363 | Electromag. Th. 1 | 4 |
| _____ | Soc. Sc./Hm. Elect. | 4 |

**Quarter 9
(Spring Only)**

| No. | Course | QH |
|----------|----------------------------|----|
| ECE 1227 | Electromag. Flds. Lab 1 | 1 |
| ECE 1364 | Electromag. Flds. Theory 2 | 4 |
| ECE 1471 | Elect. Power Sys. | 4 |
| MTH 1384 | Probability for E.E. | 4 |
| _____ | Soc. Sci./Hum. Elect. | 4 |

Fifth Year

| Quarter 10 (Winter Only) | | | |
|-----------------------------|--|-------------------------|----|
| No. | | Course | QH |
| ECE 1228 | | Electromag. Flds. Lab 2 | 1 |
| ECE 1231 | | Elect. Pwr. Lab 1 | 1 |
| ECE 1365 | | Flds. & En. Conv. | 4 |
| ECE 1472 | | Elect. Pwr. Sys. | 4 |
| | | Soc. Sci./Hum. Elect. | 4 |
| | | Tech. Elective | 4 |

| Quarter 11 (Spring Only) | | |
|-----------------------------|-------------------|----|
| No. | Course | QH |
| ECE 1232 | Elect. Pwr. Lab 2 | 2 |
| ECE 1371 | Elect. Mach. 1 | 4 |
| ECE 1379 | Trans. Pwr. Sys. | 4 |
| ECE 1474 | Power Electronics | 4 |
| | Tech. Elective | 4 |

All elective courses must satisfy departmental design, engineering science and social science/humanities requirements.

Specimen Program for the Part-Time B.S. Evening Program in Electrical and Computer Engineering

First Year

| Fall Quarter | | |
|--------------|-----------------|----|
| No. | Course | QH |
| GE 1100 | Comp. for Engr. | 4 |
| MTH 1123 | Calculus 1 | 4 |

| Winter Quarter | | |
|----------------|--------------|----|
| No. | Course | QH |
| CHM 1131 | Chemistry 1 | 4 |
| COM 1110 | FORTTRAN Lab | 1 |
| MTH 1124 | Calculus 2 | 4 |

| Spring Quarter | | |
|----------------|-------------|----|
| No. | Course | QH |
| CHM 1132 | Chemistry 2 | 4 |
| MTH 1125 | Calculus 3 | 4 |

Second Year

| Fall Quarter | | |
|--------------|-------------------------|----|
| No. | Course | QH |
| MTH 1223 | Calculus 4 | 4 |
| PHY 1221 | Physics 1 | 4 |
| PHY 1521 | Physics Lab for Engr. 1 | 1 |

| Winter Quarter | | |
|----------------|-------------------------|----|
| No. | Course | QH |
| MTH 1225 | Math Analysis 1 | 4 |
| PHY 1222 | Physics 2 | 4 |
| PHY 1522 | Physics Lab for Engr. 2 | 1 |

| Spring Quarter | | |
|----------------|---------------------|----|
| No. | Course | QH |
| GE 1110 | Engr. Graph. & Des. | 4 |
| PHY 1223 | Physics 3 | 4 |

Third Year

| Fall Quarter | | |
|--------------|-------------------|----|
| No. | Course | QH |
| ECE 1215 | Circuits & Sys. 1 | 4 |
| ECE 1221 | Measurement Lab | 1 |
| PHY 1224 | Physics 4 | 4 |

| Winter Quarter | | |
|----------------|-------------------|----|
| No. | Course | QH |
| ECE 1216 | Circuits & Sys. 2 | 4 |
| ECE 1222 | Circuits Lab 1 | 1 |
| ME 1321 | Mechanics | 4 |

| Spring Quarter | | |
|----------------|-------------------|----|
| No. | Course | QH |
| ECE 1217 | Circuits & Sys. 3 | 4 |
| ECE 1223 | Circuits Lab 2 | 1 |
| MTH 1384 | Probability | 4 |

Fourth Year

| Fall Quarter | | |
|--------------|------------------|----|
| No. | Course | QH |
| ECE 1332 | Linear Systems 1 | 4 |
| ECE 1346 | Electronics 1 | 4 |

| Winter Quarter | | |
|----------------|-------------------|----|
| No. | Course | QH |
| ECE 1224 | Electronics Lab 1 | 1 |
| ECE 1226 | Dis. Sys. Lab 1 | 1 |
| ECE 1333 | Linear Systems 2 | 4 |
| ECE 1347 | Electronics 2 | 4 |

| Spring Quarter | | |
|----------------|---------------------|----|
| No. | Course | QH |
| ECE 1225 | Electronics Lab 2 | 1 |
| ECE 1349 | Electronic Design | 4 |
| ME 1340 | Thermodynam. 1 or 4 | 4 |
| ME 1386 | Materials Science | 4 |

Fifth Year

| Fall Quarter | | |
|--------------|-------------------|----|
| No. | Course | QH |
| ECE 1363 | E/M Fld. Theory 1 | 4 |
| ECE 1381 | Comp. Engr. 1 | 4 |

| Winter Quarter | | |
|----------------|-------------------|----|
| No. | Course | QH |
| ECE 1227 | Fields Lab 1 | 1 |
| ECE 1229 | Dig. Sys. Lab | 1 |
| ECE 1364 | E/M Fld. Theory 2 | 4 |
| ECE 1382 | Comp. Engr. 2 | 4 |

| Spring Quarter | | |
|----------------|-----------------|----|
| No. | Course | QH |
| ECE 1228 | Fld. & EC Lab | 1 |
| ECE 1365 | Fld. & En. Con. | 4 |
| ECE 1383 | Comp. Engr. 3 | 4 |

Sixth Year**Fall Quarter**

| No. | Course | QH |
|-------------------------------------|---------------------|----|
| Choose 2 technical electives | | |
| ECE 1230 | VLSI Lab | 2 |
| ECE 1235 | Control Sys. Lab | 1 |
| ECE 1351 | Spcl. Tpc. IC Des. | 4 |
| ECE 1408 | Phys. Electronics | 4 |
| ECE 1420 | Control Systems | 4 |
| ECE 1454 | Communication Sys.* | 4 |
| ECE 1486 | Num. Meth. & CA | 4 |

Winter Quarter

| No. | Course | QH |
|-------------------------------------|--------------------|----|
| Choose 2 technical electives | | |
| ECE 1230 | VLSI Lab | 2 |
| ECE 1235 | Control Sys. Lab. | 1 |
| ECE 1351 | Spcl. Tpc. IC Des. | 4 |
| ECE 1384 | Comp. Engr. 4 | 4 |
| ECE 1420 | Control Systems | 4 |
| ECE 1471 | Power Systems 1 | 4 |
| MTH 1351 | Func. Comp. Var. | 4 |

Spring Quarter

| No. | Course | QH |
|------------------------------------|------------------------|----|
| ECE 1454 | Communication Sys. and | 4 |
| Choose 1 technical elective | | |
| ECE 1234 | DSP Lab | 4 |
| ECE 1456 | Dig. Sig. Proc. | 4 |
| ECE 1465 | Wave Trans. & Rec. | 4 |
| MTH 1301 | Linear Algebra | 4 |

Students must take the following courses, available during the summer quarter: ENG 1111, Freshman English 1; ENG 1113, Great Themes in Literature; ENG 1125, Technical Writing 1; and five social science/humanities courses.

Technical electives must include at least one from the following: ECE 1408, Physical Electronics; ECE 1420, Control Systems; and ECE 1465, Wave Transmission & Reception. Students must take a minimum of 24 QH of design credits to meet the graduation requirement.

The computer engineering option requires ECE 1351, Special Topics in IC Design; ECE 1230, VLSI System Design Lab; and ECE 1384, Computer Engineering 4.

*ECE 1454, a required course, is also offered in the spring quarter.

Specimen Program in General Engineering**First Year****Quarter 1**

| No. | Course | QH |
|----------|-------------------------|----|
| ENG 1111 | Fresh. Eng. 2 | 4 |
| GE 1100 | Comp. for Engr. | 4 |
| MTH 1123 | Calculus | 4 |
| PHY 1221 | Physics 1 | 4 |
| PHY 1521 | Physics Lab for Engr. 1 | 1 |

Quarter 2

| No. | Course | QH |
|----------|-------------------------|----|
| GE 1110 | Engr. Graph. & Des. | 4 |
| MTH 1124 | Calculus 2 | 4 |
| PHY 1222 | Physics 2 | 4 |
| PHY 1522 | Physics Lab for Engr. 2 | 1 |
| _____ | Soc. Sc./Hm. Electv. | 4 |

Quarter 3

| No. | Course | QH |
|----------|----------------------|----|
| ENG 1113 | Gr. Th. Lit. | 4 |
| MTH 1125 | Calculus 3 | 4 |
| PHY 1223 | Physics 3 | 4 |
| _____ | Soc. Sc./Hm. Electv. | 4 |
| _____ | Lab Elective | 1 |

Second Year**Quarter 4**

| No. | Course | QH |
|----------|----------------------|----|
| MTH 1223 | Calculus 4 | 4 |
| PHY 1224 | Physics 4 | 4 |
| _____ | Engr. Sci. Electv. | 4 |
| _____ | Soc. Sc./Hm. Electv. | 4 |

Quarter 5

| No. | Course | QH |
|----------|----------------------|----|
| MTH 1225 | Math Analysis 1 | 4 |
| _____ | Engr. Sci. Electv. | 4 |
| _____ | Coord. Study Electv. | 4 |
| _____ | Soc. Sc./Hm. Electv. | 4 |

Third Year**Quarter 6**

| No. | Course | QH |
|----------|----------------------|----|
| ENG 1340 | Writ. Wkshp: 1 | 1 |
| _____ | Engr. Sci. Electv. | 4 |
| _____ | Coord. Study Electv. | 4 |
| _____ | Coord. Study Electv. | 4 |
| _____ | Soc. Sc./Hm. Electv. | 4 |

Quarter 7

| No. | Course | QH |
|-------|----------------------|----|
| _____ | Engr. Sci. Electv. | 4 |
| _____ | Engr. Sci. Electv. | 4 |
| _____ | Coord. Study Electv. | 4 |
| _____ | Soc. Sc./Hm. Electv. | 4 |

Fourth Year**Quarter 8**

| No. | Course | QH |
|-------|-----------------------|----|
| _____ | Engr. Sci. Electv. | 4 |
| _____ | Engr. Sci. Electv. | 4 |
| _____ | Coord. Study Electv.* | 4 |
| _____ | Coord. Study Electv. | 4 |

Quarter 9

| No. | Course | QH |
|-------|----------------------|----|
| _____ | Engr. Sci. Electv. | 4 |
| _____ | Engr. Sci. Electv. | 4 |
| _____ | Coord. Study Electv. | 4 |
| _____ | Coord. Study Electv. | 4 |

Fifth Year**Quarter 10**

| No. | Course | QH |
|-------|----------------------|----|
| _____ | Engr. Sci. Electv. | 4 |
| _____ | Engr. Sci. Electv. | 4 |
| _____ | Coord. Study Electv. | 4 |
| _____ | Coord. Study Electv. | 4 |

Quarter 11

| No. | Course | QH |
|-------|----------------------|----|
| _____ | Engr. Sci. Electv. | 4 |
| _____ | Coord. Study Electv. | 4 |
| _____ | Coord. Study Electv. | 4 |
| _____ | Coord. Study Electv. | 4 |

Note: Quarters 6, 8, and 10 offered fall and winter; quarters 5, 7, and 9 offered spring and summer.

*Coordinated Study electives are courses chosen to meet the student's career objectives; these courses will be selected in conjunction with the student's adviser and are subject to the adviser's approval.

Specimen Program in Industrial Engineering

First Year

| Quarter 1 | | | Quarter 2 | | | Quarter 3 | | |
|-----------|-------------------------|----|-----------|-------------------------|----|-----------|-------------------------|----|
| No. | Course | QH | No. | Course | QH | No. | Course | QH |
| ENG 1111 | Fresh. Eng. 2 | 4 | CHM 1131 | Gen. Chem. 1 | 4 | CHM 1132 | Gen. Chem. | 4 |
| GE 1100 | Comp. for Engr. | 4 | GE 1110 | Engr. Graph. & Des. | 4 | ENG 1113 | Gr. Th. Lit. | 4 |
| MTH 1123 | Calculus 1 | 4 | MTH 1124 | Calculus 2 | 4 | IIS 1111 | Applied Engr. Software* | 1 |
| PHY 1221 | Physics 1 | 4 | PHY 1222 | Physics 2 | 4 | MTH 1125 | Calculus 3 | 4 |
| PHY 1521 | Physics Lab for Engr. 1 | 1 | PHY 1522 | Physics Lab for Engr. 2 | 1 | PHY 1223 | Physics 3 | 4 |

*Class of 1992 and beyond.

Second Year

| Quarter 4 | | | Quarter 5 | | |
|-----------|---------------------|----|-----------|----------------------------------|----|
| No. | Course | QH | No. | Course | QH |
| ECN 1115 | Prin. of Macroecon. | 4 | ECN 1116 | Prin. of Microecon. | 4 |
| IIS 1200 | Work Des. | 4 | IIS 1300 | Probabilistic Analysis for Engr. | 4 |
| MTH 1223 | Calculus 4 | 4 | ME 1201 | Statics | 5 |
| PHY 1224 | Physics 4 | 4 | MTH 1225 | Math Analysis 1 | 4 |

Third Year

| Quarter 6 | | | Quarter 7 | | |
|-----------|-----------------|----|-----------|--------------------|----|
| No. | Course | QH | No. | Course | QH |
| ECE 1171 | Elec. Engr. 1 | 4 | IIS 1320 | Statistics 2 | 4 |
| IIS 1310 | Statistics 1 | 4 | IIS 1340 | Operations Res. 1 | 4 |
| IIS 1330 | Comp. & Prog. 1 | 4 | _____ | Engr. Sci. Elect. | 4 |
| MTH 1230 | Linear Algebra | 4 | _____ | Technical Elective | 4 |
| _____ | Math Elective | 4 | | | |

Fourth Year

| Quarter 8 | | | Quarter 9 | | |
|-----------|--------------------------|----|-----------|--------------------------------|----|
| No. | Course | QH | No. | Course | QH |
| ENG 1125 | Technical Writing | 4 | IIS 1360 | Engr. Econ. & Stat. Dec. Thry. | 4 |
| IIS 1341 | Operations Res. 2 | 4 | IIS 1405 | Prod. Inv. Control | 4 |
| IIS 1350 | Dig. Sim. Tech. | 4 | _____ | Engr. Sci. Elect. | 4 |
| IIS 1400 | Systems 1 | 4 | _____ | Behavioral Sci. Elective | 4 |
| _____ | Behavioral Sci. Elective | 4 | | | |

Fifth Year

| Quarter 10 | | | Quarter 11 | | |
|------------|------------------------|----|------------|------------------------|----|
| No. | Course | QH | No. | Course | QH |
| IIS 1401 | Design Project | 4 | _____ | Tech Elective | 4 |
| IIS 1480 | People in Orgns. | 4 | _____ | Tech Elective | 4 |
| _____ | Tech Elective | 4 | _____ | Open Elective | 4 |
| _____ | Soc. Sci./Hm. Elective | 4 | _____ | Soc. Sci./Hm. Elective | 4 |

The elective courses completed must have a combined total of at least eleven engineering science credits and ten design credits.

Specimen Program in Mechanical Engineering

First Year

| Quarter 1 | | | Quarter 2 | | | Quarter 3 | | |
|-----------|-------------------------|----|-----------|-------------------------|----|-----------|--------------------|----|
| No. | Course | QH | No. | Course | QH | No. | Course | QH |
| ENG 1111 | Fresh. Eng. 2 | 4 | CHM 1131 | Gen. Chem. 1 | 4 | CHM 1131 | Gen. Chem. 2 | 4 |
| GE 1100 | Comp. for Engr. | 4 | GE 1100 | Engr. Graph. & Des. | 4 | ENG 1113 | Gr. Th. Lit. | 4 |
| MTH 1123 | Calculus 1 | 4 | MTH 1124 | Calculus 2 | 4 | ME 1111 | Key Ideas in Engr. | 1 |
| PHY 1221 | Physics 1 | 4 | PHY 1222 | Physics 2 | 4 | MTH 1125 | Calculus 3 | 4 |
| PHY 1521 | Physics Lab for Engr. 1 | 1 | PHY 1522 | Physics Lab for Engr. 2 | 1 | PHY 1223 | Physics 3 | 4 |

Second Year

| Quarter 4 | | | Quarter 5 | | |
|-----------|---------------------|----|-----------|---------------------|----|
| No. | Course | QH | No. | Course | QH |
| ECN 1115 | Prin. of Macroecon. | 4 | ECN 1115 | Prin. of Microecon. | 4 |
| _____ | or | | _____ | or | |
| ME 1392 | Meas. and Analysis | 5 | ME 1392 | Meas. and Analysis | 5 |
| ME 1201 | Statics | 5 | ME 1202 | Dynamics 1 | 5 |
| ME 1360 | Thermodynamics 1 | 5 | ME 1361 | Therm. 2 | 5 |
| MTH 1223 | Calculus 4 | 4 | MTH 1225 | Math Analysis 1 | 4 |

Third Year**Quarter 6**

| No. | Course | QH |
|----------|------------------|----|
| ENG 1340 | Writing Workshop | 1 |
| ME 1203 | Strgth Mat. 1 | 5 |
| ME 1315 | Dynamics 2 | 4 |
| ME 1375 | Fluid Mechanics | 5 |
| MTH 1230 | Linear Algebra | 4 |

Quarter 7

| No. | Course | QH |
|----------|------------------|----|
| ECE 1171 | Elect. Engr. | 4 |
| ME 1314 | Strgth Mat. 2 | 4 |
| ME 1365 | Heat Transfer | 5 |
| MTH 1226 | Math. Analysis 2 | 4 |

Fourth Year**Quarter 8**

| No. | Course | QH |
|---------|--------------------|----|
| ME 1380 | Materials Science | 5 |
| ME 1335 | Mechanical Design | 5 |
| | or | |
| ME 1337 | Thermal Design | 5 |
| ME 1362 | Thermodynamics 3 | 5 |
| | Soc. Sc./Hm. Elec. | 4 |

Quarter 9

| No. | Course | QH |
|---------|--------------------|----|
| ME 1335 | Mechanical Design | 5 |
| | or | |
| ME 1337 | Thermal Design | 5 |
| ME 1415 | Mech. Vibrations | 5 |
| | Soc. Sc./Hm. Elec. | 4 |
| | Physics/Sci. Elec. | 4 |

Fifth Year**Quarter 10**

| No. | Course | QH |
|---------|---------------------|----|
| ME 1336 | Design Project 1 | 5 |
| | Tech. Elective | 4 |
| | Tech. Elective | 4 |
| | Soc. Sci./Hm. Elec. | 4 |

Quarter 11

| No. | Course | QH |
|---------|---------------------|----|
| ME 1338 | Design Project 2 | 5 |
| | Tech. Elective | 4 |
| | Tech. Elective | 4 |
| | Soc. Sci./Hm. Elec. | 4 |

Specimen Program for the Part-Time Evening BS Program in Mechanical Engineering**First Year****Fall Quarter**

| No. | Course | QH |
|----------|-----------------|----|
| GE 1100 | Comp. for Engr. | 4 |
| MTH 1123 | Calculus 1 | 4 |

Winter Quarter

| No. | Course | QH |
|----------|-------------|----|
| CHM 1131 | Chemistry 1 | 4 |
| MTH 1124 | Calculus 2 | 4 |

Spring Quarter

| No. | Course | QH |
|----------|-------------|----|
| CHM 1132 | Chemistry 2 | 4 |
| MTH 1125 | Calculus 3 | 4 |

Second Year**Fall Quarter**

| No. | Course | QH |
|----------|------------|----|
| MTH 1223 | Calculus 4 | 4 |
| PHY 1221 | Physics 1 | 4 |

Winter Quarter

| No. | Course | QH |
|----------|-------------------------|----|
| MTH 1225 | Math Anal. 1 | 4 |
| PHY 1222 | Physics 2 | 4 |
| PHY 1522 | Physics Lab for Engr. 2 | 1 |

Spring Quarter

| No. | Course | QH |
|----------|--------------|----|
| MTH 1226 | Math Anal. 2 | 4 |
| PHY 1223 | Physics 3 | 4 |

Third Year**Fall Quarter**

| No. | Course | QH |
|----------|-----------|----|
| ME 1201 | Statics* | 5 |
| PHY 1224 | Physics 4 | 4 |

Winter Quarter

| No. | Course | QH |
|----------|-------------------|----|
| ME 1392 | Meas. & Analysis† | 5 |
| MTH 1230 | Linear Algebra | 4 |

Spring Quarter

| No. | Course | QH |
|---------|--------------------|----|
| ME 1360 | Thermodynamics 1* | 5 |
| GE 1110 | Engr. Graph & Des. | 4 |

Fourth Year**Fall Quarter**

| No. | Course | QH |
|---------|-------------------|----|
| ME 1203 | Strgth. Mat. 1† | 5 |
| ME 1361 | Thermodynamics 2* | 5 |

Winter Quarter

| No. | Course | QH |
|---------|------------------|----|
| ME 1202 | Dynamics 1* | 5 |
| ME 1375 | Fluid Mechanics† | 5 |

Spring Quarter

| No. | Course | QH |
|---------|----------------|----|
| ME 1314 | Strgth. Mat. 2 | 4 |
| ME 1365 | Heat Transfer† | 5 |

Fifth Year**Fall Quarter**

| No. | Course | QH |
|---------|-------------------|----|
| ME 1315 | Dynamics 2 | 4 |
| ME 1335 | Mechanical Design | 5 |

Winter Quarter

| No. | Course | QH |
|---------|------------------|----|
| ME 1336 | Design Project 1 | 5 |
| ME | Tech. Elective | 4 |

Spring Quarter

| No. | Course | QH |
|---------|-------------------|----|
| ME 1338 | Design Project 2 | 5 |
| ME 1415 | Mech. Vibrations† | 5 |
| ME | Tech. Elective | 4 |

Sixth Year

| Fall Quarter | | | Winter Quarter | | | Spring Quarter | | |
|--------------|--------------------------------|----|----------------|----------------|----|----------------|----------------|----|
| No. | Course | QH | No. | Course | QH | No. | Course | QH |
| ME 1362 | Thermodynamics 3 [†] | 5 | ECE 1171 | Elect. Engr. 1 | 4 | ME 1337 | Thermal Design | 5 |
| ME 1380 | Materials Science [†] | 5 | ME ——— | Tech. Elective | 4 | ME 1480 | Beh. Materials | 4 |

ENG 1340, Writing Workshop, required in the sixth year, is offered in the fall, winter, or spring quarter. Students must take the following required courses, available during the summer quarter: ECN 1115, Principles of Macroeconomics; ECN 1116, Principles of Microeconomics; ENG 1111, Introduction to Literature; and ENG 1113, Great Themes. Four additional social science/humanities courses are also required. (See College of Engineering requirements as to depth and breadth.)

[†]Additional class time is required.

[†]Lab is required.

Specimen BS/MS Program in Mechanical Engineering

Freshmen year students admitted without advanced standing credit may take either the regular or the honors courses.

Second Year

| Quarter 4 | | | Quarter 5 | | |
|-----------|--------------------------|----|-----------|-----------------------|----|
| No. | Course | QH | No. | Course | QH |
| ECN 1115 | Prin. and Prob. of Econ. | 4 | ECE 1171 | Electrical Engr. | 4 |
| ME 1201 | Statics | 5 | ME 1202 | Dynamics 1 | 5 |
| ME 1360 | Thermodynamics 1 | 5 | ME 1361 | Thermodynamics 2 | 5 |
| ME 1392 | Meas. & Analysis | 5 | ME 1380 | Materials Sci. | 5 |
| MTH 1223 | Calculus 4 | 5 | MTH 1225 | Math Analysis 1 | 4 |
| | | | ————— | Soc. Sci./Hum. Elect. | 4 |

Third Year

| Quarter 6 | | | Quarter 7 | | |
|-----------|----------------|----|-----------|-------------------|----|
| No. | Course | QH | No. | Course | QH |
| ME 1203 | Strgth Mat. 1 | 5 | ME 1314 | Strgth Mat. 2 | 4 |
| ME 1315 | Dynamics 2 | 4 | ME 1365 | Heat Transfer | 5 |
| ME 1375 | Fluid Mech. 1 | 5 | ME 1415 | Mech. Vibrations | 4 |
| MTH 1230 | Linear Algebra | 4 | MTH 1226 | Math Analysis 2 | 4 |
| | | | ————— | Phy/Sci. Elective | 4 |

Fourth Year

| Quarter 8 | | | Quarter 9 | | |
|-----------|-------------------|----|-----------|----------------------|----|
| No. | Course | QH | No. | Course | QH |
| ME 1335 | Mechanical Design | 5 | ME 1335 | Mechanical Design | 5 |
| | or | | | or | |
| ME 1337 | Thermal Design | 5 | ME 1337 | Thermal Design | 5 |
| ME 1336 | Design Project 1 | 5 | ME 1338 | Design Project 2 | 5 |
| ME 1362 | Thermodynamics 3 | 5 | ————— | Tech. Elective | 4 |
| ME 3100 | Math Meth. | 4 | ————— | Tech. Elective | 4 |
| ————— | Tech. Elective | 4 | ————— | Soc. Sci./Hum. Elec. | 4 |

Fifth Year

| Quarter 10 | | | Quarter 11 | | | Quarter 12 | | |
|------------|------------------|----|------------|--------------|----|------------|--------------|----|
| No. | Course | QH | No. | Course | QH | No. | Course | QH |
| ————— | Grad. Course | 4 | ————— | Grad. Course | 4 | ————— | Grad. Course | 4 |
| ————— | Grad. Course | 4 | ————— | Grad. Course | 4 | ————— | Grad. Course | 4 |
| ————— | Grad. Course | 4 | ————— | Thesis | 4 | ————— | Thesis | 3 |
| ————— | Seminar (Thesis) | 1 | | | | | | |
| ————— | Tech. Elective | 4 | | | | | | |

Two additional social science/humanity courses are required, which may be taken at night while on co-op (by petition), or students can elect to eliminate a co-op quarter during the fourth year (by petition).

Social science/humanities courses must satisfy depth and breadth requirements.

A 3.3 or better QPA is required for admission to the program after the freshman year. Freshmen are eligible for entry only through the Admissions Department prior to enrolling at Northeastern. All students must maintain a 3.0 or better QPA to stay in the program.

A complete program must be arranged with, and approved by, a faculty adviser no later than the end of the third year. The program will vary for each student and the above is only a sample arrangement.

Consult the *Mechanical Engineering Undergraduate Curriculum Guide* for information regarding choice of BS electives.

Graduate courses are selected according to the graduate degree requirements listed in the *Graduate School of Engineering Student Guide and Catalog*.

School of Engineering Technology

Specimen Program in Aerospace Maintenance

First Year

Quarter 1

| No. | Course | QH |
|----------|---------------|----|
| ENG 1100 | Fresh. Eng. 1 | 4 |
| GET 1170 | Graphics 1 | 4 |
| MTH 1194 | Calculus 2 | 4 |
| PHY 1191 | Physics 1 | 4 |
| PHY 1196 | Physics Lab 1 | 1 |

Second Year

Third Year

Quarter 2

| No. | Course | QH |
|----------|------------------------|----|
| ENG 1111 | Fresh. Eng. 2 | 4 |
| GET 1100 | Cp. Pg. for Engr. Tch. | 4 |
| PHY 1192 | Physics 2 | 4 |
| PHY 1197 | Physics Lab 2 | 1 |
| | Soc. Sc./Hm. Electv. | 4 |

Quarter 4

| No. | Course | QH |
|----------|-----------------|----|
| ECN 1115 | Econ. Prin. | 4 |
| EET 1320 | Elec. & Elec. 1 | 4 |
| ENG 1340 | Writ. Wkshp. | 1 |
| MET 1301 | Mechanics A | 4 |
| MET 1340 | Thermo. A. | 4 |

Quarter 6

| No. | Course | QH |
|----------|----------------------|----|
| MET 1315 | Strss. Anal. B or | 4 |
| MET 1341 | Thermo. B | 4 |
| MET 1390 | Meas. & Ana. Lab | 2 |
| MET 1481 | Materials B | 4 |
| | Tech. Elective | 4 |
| | Soc. Sc./Hm. Electv. | 4 |
| | Open Electv. | |

Quarter 3

| No. | Course | QH |
|----------|--------------------|----|
| ENG 1114 | Fresh. Tech. Writ. | 4 |
| GET 1171 | Graphics 2 | 4 |
| MTH 1195 | Calculus 3 | 4 |
| PHY 1193 | Physics 3 | 4 |
| PHY 1198 | Physics Lab 3 | 1 |

Quarter 5

| No. | Course | QH |
|----------|----------------------|----|
| MET 1302 | Mechanics B | 4 |
| MET 1314 | Strss. Anal. A | 4 |
| MET 1380 | Materials A | 4 |
| | Soc. Sc./Hm. Electv. | 4 |

Quarter 7

| No. | Course | QH |
|----------|----------------------|----|
| MET 1370 | Fluid Mech. A | 4 |
| MET 1391 | Tech. Lab A or | 2 |
| MET 1393 | Tech. Lab C | |
| | Tech. Elective | 4 |
| | Soc. Sc./Hm. Electv. | 4 |
| | Soc. Sc./Hm. Electv. | 4 |

Specimen Program in Electrical Engineering Technology

First Year

Quarter 1

| No. | Course | QH |
|----------|------------------|----|
| ENG 1110 | Fresh. Eng. 1 | 4 |
| GET 1170 | Engr. Graphics 1 | 4 |
| MTH 1191 | College Algebra | 4 |
| PHY 1191 | Physics 1 | 4 |
| PHY 1196 | Physics Lab 1 | 1 |

Second Year

Third Year

Fourth Year

Quarter 2

| No. | Course | QH |
|----------|------------------|----|
| ENG 1111 | Fresh. Eng. 2 | 4 |
| GET 1100 | Computer Prog. 1 | 4 |
| MTH 1192 | Pre-Calculus | 4 |
| PHY 1192 | Physics 2 | 4 |
| PHY 1197 | Physics Lab 2 | 1 |

Quarter 4

| No. | Course | QH |
|----------|----------------------|----|
| ECN 1115 | Prin. of Macroecon. | 4 |
| EET 1151 | Circ. Analys. 1 | 4 |
| MTH 1194 | Calculus 2 | 4 |
| | Soc. Sc./Hm. Electv. | 4 |

Quarter 6

| No. | Course | QH |
|----------|--------------------|----|
| EET 1125 | Circuit Lab 2 | 2 |
| EET 1311 | Electronics 1 | 4 |
| EET 1353 | Circ. Analys. 3 | 4 |
| EET 1360 | Engr. Analys. 1 | 4 |
| SPC | Spch./Com. Electv. | 4 |

Quarter 8

| No. | Course | QH |
|----------|----------------------|----|
| EET 1313 | Electronics 3 | 4 |
| EET 1327 | Adv. Elec. Lab 1 | 2 |
| EET 1330 | Energy Conversion | 4 |
| | Tech. Elective | 4 |
| | Soc. Sc./Hm. Electv. | 4 |

Quarter 3

| No. | Course | QH |
|----------|--------------------|----|
| ENG 1114 | Fresh. Tech. Writ. | 4 |
| GET 1171 | Engr. Graph. 2 | 4 |
| MTH 1193 | Calculus 1 | 4 |
| PHY 1193 | Physics 3 | 4 |
| PHY 1198 | Physics Lab 3 | 1 |

Quarter 5

| No. | Course | QH |
|----------|----------------------|----|
| EET 1124 | Circuit Lab 1 | 2 |
| EET 1152 | Circ. Analys. 2 | 4 |
| MET 1319 | Mechanics | 4 |
| MTH 1195 | Calculus 3 | 4 |
| | Soc. Sc./Hm. Electv. | 4 |

Quarter 7

| No. | Course | QH |
|----------|---------------------|----|
| EET 1310 | Electrical Measure. | 4 |
| EET 1312 | Electronics 2 | 4 |
| EET 1323 | Electrical Lab | 2 |
| EET 1354 | Circ. Analys. 4 | 4 |
| ENG 1340 | Writing Workshop | 1 |

Quarter 9

| No. | Course | QH |
|----------|----------------------|----|
| EET 1314 | Pulse & Digital 1 | 4 |
| EET 1328 | Adv. Elec. Lab 2 | 2 |
| EET 1337 | Distributed Systems | 4 |
| | Technical Elective | 4 |
| | Soc. Sc./Hm. Electv. | 4 |

Fifth Year

| Quarter 10 | | |
|------------|-------------------|----|
| No. | Course | QH |
| EET 1329 | Adv. Elec. Lab 3 | 2 |
| EET 1370 | Digital Cmptrs. 1 | 4 |
| EET 1377 | Control Engr. 1 | 4 |
| | Tech. Elective | 4 |
| | Open Elective* | 4 |

| Quarter 11 | | |
|------------|---------------------|----|
| No. | Course | QH |
| EET 1371 | Digital Computers 2 | 4 |
| EET 1378 | Control Engr. 2 | 4 |
| | Technical Elective | 4 |
| | Soc. Sc./Hm. Elctv. | 4 |

Technical electives must be chosen from:

| No. | Course | QH |
|----------|----------------------|----|
| CHT 1381 | Nuclear Technology | 4 |
| CT 1311 | C Language | 4 |
| EET 1315 | Pulse & Digital 2 | 4 |
| EET 1317 | Communication Sys. 1 | 4 |
| EET 1318 | Communication Sys. 2 | 4 |
| EET 1319 | Communication Sys. 3 | 4 |

| No. | Course | QH |
|----------|---------------------|----|
| EET 1362 | Power Systems 1 | 4 |
| EET 1363 | Power Systems 2 | 4 |
| EET 1364 | Power Systems 3 | 4 |
| EET 1390 | Optical Instrument. | 4 |
| IIS 1366 | Engineering Economy | 4 |
| MET 1340 | Thermodynamics A | 4 |
| MET 1341 | Thermodynamics B | 4 |
| MET 1380 | Materials A | 4 |
| MET 1381 | Materials B | 4 |

* No Phys. Ed., ROTC, or remedial.

Specimen Program in Mechanical Engineering Technology

First Year

| Quarter 1 | | |
|-----------|----------------------|----|
| No. | Course | QH |
| ENG 1110 | Fresh. Eng. 1 | 4 |
| GET 1170 | Engr. Graphics. 1 or | 4 |
| GET 1100 | Computer Prog. 1 | 4 |
| MTH 1191 | College Algebra | 4 |
| PHY 1191 | Physics 1 | 4 |
| PHY 1196 | Physics Lab 1 | 1 |

| Quarter 2 | | |
|-----------|------------------|----|
| No. | Course | QH |
| ENG 1111 | Fresh. Eng. 2 | 4 |
| GET 1110 | Computer 1 or | 4 |
| GET 1170 | Engr. Graphics 1 | 4 |
| MTH 1192 | Pre-Calculus | 4 |
| PHY 1192 | Physics 2 | 4 |
| PHY 1197 | Physics Lab 2 | 1 |

| Quarter 3 | | |
|-----------|--------------------|----|
| No. | Course | QH |
| ENG 1114 | Fresh. Tech. Writ. | 4 |
| GET 1171 | Engr. Graphics 2 | 4 |
| MTH 1193 | Calculus 1 | 4 |
| PHY 1193 | Physics 3 | 4 |
| PHY 1198 | Physics Lab 3 | 1 |

Second Year

| Quarter 4 | | |
|-----------|-------------------|----|
| No. | Course | QH |
| EET 1320 | Elec./Electronics | 4 |
| GET 1364 | Kinematics | 4 |
| MET 1301 | Mechanics A | 4 |
| MTH 1194 | Calculus 2 | 4 |

| Quarter 5 | | |
|-----------|-------------------|----|
| No. | Course | QH |
| CHM 1130 | Chemistry 1 | 4 |
| CHM 1138 | Chem. Lab | 1 |
| MET 1302 | Mechanics B | 4 |
| MET 1314 | Stress Analysis A | 4 |
| MTH 1195 | Calculus 3 | 4 |

Third Year

| Quarter 6 | | |
|-----------|---------------------|----|
| No. | Course | QH |
| ECN 1115 | Prin. of Macroecon. | 4 |
| ENG 1340 | Writ. Wkshp. | 1 |
| MET 1303 | Mechanics C | 4 |
| MET 1315 | Stress Analysis B | 4 |
| MET 1340 | Thermo A. | 4 |
| MET 1390 | Meas. Lab | 2 |

| Quarter 7 | | |
|-----------|---------------------|----|
| No. | Course | QH |
| MET 1341 | Thermo B | 4 |
| MET 1370 | Fluid Mechanics A | 4 |
| MET 1380 | Materials A | 4 |
| MET 1391 | Tech. Lab A | 2 |
| | Soc. Sc./Hm. Elctv. | 4 |

Fourth Year

| Quarter 8 | | |
|-----------|---------------------|----|
| No. | Course | QH |
| MET 1330 | Mech. Des. A | 4 |
| MET 1371 | Fluid Mechanics B | 4 |
| MET 1392 | Tech. Lab B | 2 |
| MET 1396 | Machine Shop or | 4 |
| IIS | Elective | |
| | Soc. Sc./Hm. Elctv. | 4 |

| Quarter 9 | | |
|-----------|---------------------|----|
| No. | Course | QH |
| MET 1331 | Mech. Des. B | 4 |
| MET 1343 | Heat Transfer | 4 |
| MET 1393 | Tech. Lab C | 2 |
| | Soc. Sc./Hm. Elctv. | 4 |
| | Technical Elective | 4 |

Fifth Year**Quarter 10**

| No. | Course | QH |
|----------|---------------------|----|
| MET 1366 | Eng. Economy | 4 |
| MET 1394 | Tech. Lab D | 2 |
| MET 1481 | Materials B or | 4 |
| MET 1416 | Stress Analysis C | |
| | Soc. Sc./Hm. Elctv. | 4 |
| | Technical Elec. | 4 |

Technical electives must be chosen from:

| No. | Course | QH |
|----------|----------------------|----|
| MET 1414 | Mech. Vibrations | 4 |
| MET 1415 | Exp. Stress Analysis | 4 |
| MET 1416 | Stress Analysis C | 4 |
| MET 1444 | Power Generation | 4 |
| MET 1481 | Materials B | 4 |

Quarter 11

| No. | Course | QH |
|----------|---------------------|----|
| MET 1342 | Ref. & Air Cond. | |
| MET 1395 | Tech. Lab E | 2 |
| | Open Elective* | 4 |
| | Soc. Sc./Hm. Elctv. | 4 |

*No Phys. Ed, ROTC, or remedial.

Specimen Program in Computer Technology**First Year****Quarter 1**

| No. | Course | QH |
|----------|------------------|----|
| ENG 1110 | Fresh. Eng. 1 | 4 |
| GET 1170 | Engr. Graphics 1 | 4 |
| MTH 1191 | College Algebra | 4 |
| PHY 1191 | Physics 1 | 4 |
| PHY 1196 | Physics Lab 1 | 1 |

Second Year**Third Year****Fourth Year****Fifth Year****Quarter 2**

| No. | Course | QH |
|----------|-----------------|----|
| CT 1105 | Intro. to Prog. | 4 |
| ENG 1111 | Fresh. Engr. 2 | 4 |
| MTH 1192 | Pre-Calculus | 4 |
| PHY 1192 | Physics 2 | 4 |
| PHY 1197 | Physics Lab 2 | 1 |

Quarter 4

| No. | Course | QH |
|----------|--------------------|----|
| CT 1310 | FORTRAN | 4 |
| ECN 1115 | Economics 1 | 4 |
| EET 1151 | Circets. Analys. 1 | 4 |
| MTH 1194 | Calculus 2 | 4 |

Quarter 6

| No. | Course | QH |
|----------|------------------|----|
| CT 1340 | Mod. Prog. Tech. | 4 |
| CT 1335 | Num. Methods | 4 |
| CT 1345 | Assembly Lang. | 4 |
| EET 1311 | Electronics 1 | 4 |
| ENG 1340 | Writing Workshop | 1 |

Quarter 8

| No. | Course | QH |
|---------|------------------------|----|
| CT 1335 | Num. Methods | 4 |
| CT 1369 | Comp. Logic | 4 |
| CT 1375 | CPU Hdwre. Arch. | 4 |
| CT | Comp. Tech. Elec. | 4 |
| | Soc. Sci./Hum. Electv. | 4 |

Quarter 10

| No. | Course | QH |
|---------|----------------------|----|
| CT 1356 | Cmplx. Per. Hdw. | 4 |
| CT 1360 | Industry Software | 4 |
| CT | Comp. Tech. Elec. | 4 |
| | Soc. Sc./Hm. Electv. | 4 |

Quarter 3

| No. | Course | QH |
|----------|--------------------|----|
| CT 1150 | Basic Comp. Organ. | 4 |
| ENG 1114 | Fresh. Tech. Writ. | 4 |
| MTH 1193 | Calculus 1 | 4 |
| PHY 1193 | Physics 3 | 4 |
| PHY 1198 | Physics Lab 3 | 1 |

Quarter 5

| No. | Course | QH |
|----------|----------------------|----|
| CT 1311 | "C" Language | 4 |
| EET 1152 | Circuits Analysis 2 | 4 |
| MTH 1195 | Calculus 3 | 4 |
| | Soc. Sc./Hm. Electv. | 4 |

Quarter 7

| No. | Course | QH |
|---------|-----------------------|----|
| CT 1330 | Data Structures | 4 |
| CT 1368 | Semicond. Logic | 4 |
| CT 1374 | Intro. to CPU Hdwre. | 4 |
| | Soc. Sci./Hum. Elect. | 4 |

Quarter 9

| No. | Course | QH |
|---------|----------------------|----|
| CT 1355 | Micro-Per. Hardware | 4 |
| CT 1380 | Data Comm. Methods | 4 |
| CT | Comp. Tech. Elective | 4 |
| | Tech Elective | 4 |

Quarter 11

| No. | Course | QH |
|---------|----------------------|----|
| CT 1351 | Adv. Comp. Organ. | 4 |
| CT 1365 | Industry Hardware | 4 |
| | Technical Elec. | 4 |
| | Soc. Sc./Hm. Electv. | 4 |

College of Nursing

Specimen Program for Baccalaureate Degree in Nursing

First Year

Quarter 1

| No. | Course | QH |
|----------|---------------|----|
| BIO 1115 | Human Biology | 4 |
| ENG 1100 | Fresh. Eng. 1 | 4 |
| MTH 1106 | Fund. of Math | 4 |
| NUR 1100 | Nursing | 4 |

Second Year

Quarter 2

Quarter 2

| No. | Course | QH |
|----------|-----------------|----|
| BIO 1152 | Anat. & Phys. 1 | 4 |
| CHM 1111 | Gen. Chem. | 5 |
| ENG 1111 | Fresh. Eng. 2 | 4 |
| NUR 1101 | Nursing | 4 |

Quarter 3

| No. | Course | QH |
|----------|-----------------|----|
| BIO 1153 | Anat. & Phys. 2 | 4 |
| CHM 1112 | Gen. Chem. | 5 |
| NUR 1102 | Hum. Nutrition | 4 |
| SOC 1100 | Sociology | 4 |

Quarter 4

| No. | Course | QH |
|----------|-----------------------|----|
| BIO 1120 | Bas. Microbiol. | 4 |
| BIO 1154 | Anat. & Phys. 3 | 4 |
| NUR 1200 | Nursing/Human Needs 1 | 6 |
| PSY 1111 | Fnd. Psych. 1 | 4 |

Quarter 5

| No. | Course | QH |
|----------|----------------------------|----|
| NUR 1201 | Nursing/Human Needs 2 | 6 |
| NUR 1202 | Intro. Pathophys. Concepts | 4 |
| PSY 1112 | Fnd. Psych. 2 | 4 |
| | Computer Elect. | 4 |

Third Year

Quarter 6

| No. | Course | QH |
|----------|-------------------------|----|
| NUR 1300 | Nursing/Common Problems | 7 |
| NUR 1302 | Nur. Trans. (R.N. only) | 9 |
| PSY 1241 | Behavior & Dev. 1 | 4 |
| PCL 1305 | Pharmacology | 3 |
| SOA 1100 | Peoples & Cultures | 4 |

Quarter 7

| No. | Course | QH |
|----------|-------------------|----|
| ENG 1350 | Interm. Writing | 4 |
| NUR 1301 | Psych. Nursing | 7 |
| PSY 1242 | Behavior & Dev. 2 | 4 |

Fourth Year

Quarter 8

| No. | Course | QH |
|----------|--------------------|----|
| NUR 1401 | Med. Surg. Nursing | 9 |
| | Hum. Elective | 4 |
| | Elective | 4 |

Quarter 9

| No. | Course | QH |
|----------|------------------|----|
| NUR 1400 | Mat. Child Nur. | 9 |
| | Hum. Elective | 4 |
| | History Elective | 4 |

Fifth Year

Quarter 10

| No. | Course | QH |
|----------|-----------------|----|
| NUR 1500 | Com. Hlth. Nur. | 9 |
| | Elective | 4 |
| | Elective | 4 |

Quarter 11

| No. | Course | QH |
|----------|-----------------------|----|
| NUR 1501 | Contemp. Nur. | 5 |
| NUR 1502 | Intro. Nur. Res. | 4 |
| | Elective (if desired) | 4 |

177 QH = Minimum graduation requirement.

Degrees

The College of Nursing offers a five-year program leading to the Bachelor of Science in Nursing. The program is open to registered nurses in both day and evening sections. Students eligible for advanced placement may complete the program in less than five years.

Quantitative Requirements

Candidates for the bachelor of science degree must successfully complete all of the prescribed courses in the applicable curriculum. For the bachelor of science degree this totals 177 quarter hours. The prescribed periods of cooperative work at health agencies associated with the University are not required of the registered nurses.

College of Pharmacy and Allied Health Professions

Specimen Program in Pharmacy (Five-Year Cooperative)

First Year

Quarter 1

| No. | Course | QH |
|----------|------------------------|----|
| BIO 1106 | General Biology | 4 |
| CHM 1111 | General Chemistry | 5 |
| MTH 1106 | Fund. Math.* <i>or</i> | 4 |
| MTH 1107 | Func. & Bas. Cal.* | 4 |
| PHP 1100 | Prof. of Pharm. | 1 |
| _____ | A. & S. Electives | 4 |

Quarter 2

| No. | Course | QH |
|----------|--|----|
| BIO 1107 | Animal Biology | 4 |
| ENG 1110 | Fresh. English 1 | 4 |
| MTH 1107 | Func. & Bas. Cal.* | 4 |
| _____ | <i>or</i> | |
| MTH 1108 | Calculus* | 4 |
| PAH 1135 | Prof. Dynamics in Hlth. Care Delivery | 4 |

Quarter 3

| No. | Course | QH |
|----------|-------------------|----|
| CHM 1122 | General Chemistry | 5 |
| ENG 1111 | Fresh. English 2 | 4 |
| _____ | A. & S. Elective | 4 |
| _____ | <i>or</i> | |
| MTH 1108 | Calculus | 4 |
| _____ | A & S Elective | 4 |

Second Year

Quarter 4 (Entire Class) (Sept.-Dec.)

| No. | Course | QH |
|----------|---------------------|----|
| CHM 1268 | Organic Chemistry 1 | 5 |
| PCT 1240 | Pharm. Calculations | 4 |
| PHY 1201 | Physics 1 | 4 |
| _____ | A. & S. Elective | 4 |

Quarter 4A (Entire Class) (Jan.-March)

| No. | Course | QH |
|----------|---------------------|----|
| CHM 1269 | Organic Chemistry 2 | 5 |
| PAH 1202 | Anat. & Physiology | 5 |
| _____ | A. & S. Elective | 4 |
| PHY 1203 | Physics 3 | 4 |

Quarter 5 (April-June & June-Sept.)

| No. | Course | QH |
|----------|--|----|
| PAH 1204 | Anat. & Physiology 2 | 5 |
| PAH 1280 | Biochemistry | 5 |
| PHP 1303 | Interpersonal Skills for Health Prof. | 4 |
| _____ | A. & S. Elective | 4 |

Third Year

Quarter 6

| No. | Course | QH |
|----------|--------------------|----|
| PCL 1410 | Pathology | 4 |
| PCT 1310 | Pharmaceutics Lab | 1 |
| PCT 1340 | Pharmaceutics 1 | 4 |
| PMC 1321 | Phrm. Anl. & Q.C. | 4 |
| PMC 1419 | Med. Chm./Pharm. 1 | 5 |

Quarter 7

| No. | Course | QH |
|----------|---------------------|----|
| ENG 1340 | Writing Workshop | 1 |
| PCL 1420 | Pharm. Med./Chem. 2 | 6 |
| PCL 1451 | Pharmacology Lab | 1 |
| PCT 1320 | Pharmaceutics Lab 2 | 2 |
| PCT 1350 | Pharmaceutics 2 | 5 |
| PHP 1304 | Social Psychology | 4 |

Fourth Year

Quarter 8

| No. | Course | QH |
|----------|--------------------------------|----|
| INT 1100 | Beg. Computer Use | 4 |
| PCL 1422 | Med./Chm. Phm. 3 | 6 |
| PCT 1440 | Biopharm./ Pharmacokinetics | 4 |
| PMC 1420 | Anti-infectives | 5 |

Quarter 9 (Entire Class) (April-June)

| No. | Course | QH |
|----------|---------------------------------------|----|
| PCT 1441 | Phrmcoknetc. Prin. in Drug Therapy | 4 |
| PHP 1401 | Drug Info. & Eval. | 3 |
| PHP 1402 | Parapharmaceuticals | 2 |
| PHP 1601 | Non-Presc. Med. | 4 |
| PHP 1602 | Pharmaco- therapeutics | 5 |

Fifth Year

Quarter 10 (Summer)

| No. | Course | QH |
|----------|---------------------------|----|
| PHP 1302 | Phrm. Admin. 1 | 4 |
| PHP 1503 | Prof. Prac. Lab 1 | 1 |
| _____ | Prof. Elective | 4 |
| _____ | A. & S. Elect. | 8 |
| _____ | <i>or</i> | |
| PHP 1501 | Phrm. Extnrshp. <i>or</i> | 4 |
| PHP 1502 | Clin. Pharmacy | 15 |

Quarter 11 (Fall)

| No. | Course | QH |
|----------|---------------------------|----|
| PHP 1301 | Ph. Juris. | 4 |
| PHP 1305 | Hosp. Phrm. Mgmt. | 4 |
| _____ | <i>or</i> | |
| PHP 1306 | Com. Phrm. Mgt. | 4 |
| TOX 1300 | Toxicology | 4 |
| _____ | Prof. Elective | 4 |
| _____ | <i>or</i> | |
| PHP 1501 | Phrm. Extnrshp. <i>or</i> | 4 |
| PHP 1502 | Clin. Pharmacy | 15 |

**Quarter 12
(Winter)**

| No. | Course | QH |
|----------|--------------------|----|
| PHP 1302 | Phrm. Admin. 1 | 4 |
| PHP 1503 | Prof. Prac. Lab 1 | 1 |
| _____ | Prof. Elective | 4 |
| _____ | A. & S. Elect. | 8 |
| _____ | or | |
| PHP 1501 | Phrm. Extnrshp. or | 4 |
| PHP 1502 | Clin. Pharmacy | 15 |

**Quarter 13
(Spring)**

| No. | Course | QH |
|----------|--------------------|----|
| PHP 1301 | Ph. Juris | 4 |
| PHP 1305 | Hosp. Phrm. Mgmt. | 4 |
| _____ | or | |
| PHP 1306 | Com. Phrm. Mgt. | 4 |
| TOX 1300 | Toxicology | 4 |
| _____ | Prof. Elective | 4 |
| _____ | or | |
| PHP 1501 | Phrm. Extnrshp. or | 4 |
| PHP 1502 | Clin. Pharmacy | 15 |

*Minimum math requirement: MTH 1108.

Notes: About one quarter of the class will be in PHP 1502, one quarter in PHP 1501, and one half in the classroom for each quarter. Students must take a total of 8 credits for professional electives. All 8 credits may be taken in one quarter or as outlined above.

English 1340 Writing Workshop—Upper-division writing requirement can be filled by taking English 1340 upon completion of 80 QH beginning with the class of 1989.

Specimen Program in Dental Hygiene (BS)

Students are admitted directly to the Forsyth School for Dental Hygienists and should contact the school for catalogs, applications, and complete program information by writing to: Forsyth School for Dental Hygienists, 140 The Fenway, Boston, Massachusetts 02115.

First Year

Quarter 1

| No. | Course | QH |
|----------|------------------|----|
| BIO 1106 | General Biology | 4 |
| ENG 1110 | Fresh. English 1 | 4 |
| MTH 1106 | Fund. Math | 4 |
| PSY 1111 | Fund. Psych. 1 | 4 |
| _____ | Prof. Course | 1 |

Quarter 2

| No. | Course | QH |
|----------|-----------------------|----|
| BIO 1107 | Animal Biology | 4 |
| CHM 1111 | General Chemistry | 5 |
| MTH 1107 | Func. & Bas. Calculus | 4 |
| PAH 1135 | Prof. Dyn. in Hlth. | 4 |
| _____ | Care Delivery | |
| _____ | Prof. Course | 2 |

Quarter 3

| No. | Course | QH |
|----------|-------------------|----|
| BIO 1120 | Bas. Microbio. | 4 |
| CHM 1112 | General Chemistry | 5 |
| ENG 1111 | Fresh. English 2 | 4 |
| SOC 1100 | Intro. Soc. | 4 |
| _____ | Prof. Course | 2 |

Second Year

Quarter 4

| No. | Course | QH |
|----------|----------------------|----|
| PAH 1203 | Anat. & Physiology 1 | 5 |
| _____ | Prof. Courses | 10 |
| _____ | Elective | 4 |

Quarter 5

| No. | Course | QH |
|----------|----------------------|----|
| PAH 1204 | Anat. & Physiology 2 | 5 |
| _____ | Prof. Courses | 9 |
| _____ | Elective | 4 |

Quarter 6

| No. | Course | QH |
|----------|---------------|----|
| PHP 1303 | Inter. Skills | 4 |
| _____ | Prof. Courses | 12 |

Third Year

Quarter 7

| No. | Course | QH |
|----------|---------------|----|
| MTH 1152 | Stat. Think. | 4 |
| _____ | Prof. Courses | 12 |

Quarter 8

| No. | Course | QH |
|-------|---------------|----|
| _____ | Prof. Courses | 11 |
| _____ | Elective | 4 |

Quarter 9

| No. | Course | QH |
|-------|---------------|----|
| _____ | Prof. Courses | 11 |
| _____ | Elective | 4 |

Fourth Year

Quarter 10

| No. | Course | QH |
|----------|----------------|----|
| ENG 1380 | Eng. Writing | 4 |
| _____ | Prof. Courses | 11 |
| _____ | Prof. Elective | 4 |

Quarter 11

| No. | Course | QH |
|-------|----------------|----|
| _____ | Prof. Courses | 6 |
| _____ | Prof. Elective | 4 |
| _____ | Elective | 4 |

Quarter 12

| No. | Course | QH |
|-------|----------------|----|
| _____ | Prof. Courses | 4 |
| _____ | Prof. Elective | 8 |
| _____ | Elective | 4 |

Specimen Program in Dental Hygiene (AS)

First Year

Quarter 1

| No. | Course | QH |
|----------|-------------------|----|
| BIO 1150 | Anat. & Phys. 1 | 5 |
| CHM 1101 | General Chemistry | 4 |
| _____ | Prof. Courses | 12 |

Quarter 2

| No. | Course | QH |
|----------|-------------------|----|
| BIO 1151 | Anat. & Phys. 2 | 5 |
| CHM 1102 | General Chemistry | 4 |
| _____ | Prof. Courses | 9 |

Quarter 3

| No. | Course | QH |
|----------|---------------|----|
| BIO 1120 | Microbio. | 4 |
| _____ | Prof. Courses | 12 |

Second Year**Quarter 4**

| No. | Course | QH |
|----------|------------------|----|
| ENG 1110 | Fresh. English 1 | 4 |
| | Prof. Courses | 12 |

Quarter 5

| No. | Course | QH |
|----------|---------------|----|
| PSY 1111 | Fnd. Psych. 1 | 4 |
| | Prof. Courses | 11 |

Quarter 6

| No. | Course | QH |
|----------|------------------|----|
| ENG 1111 | Fresh. English 2 | 4 |
| SOC 1100 | Intro Soc. | 4 |
| | Prof. Courses | 11 |

Specimen Program in Medical Laboratory Science (Five-Year Cooperative)

First Year**Quarter 1**

| No. | Course | QH |
|----------|----------------|----|
| BIO 1106 | Gen. Bio. | 4 |
| ENG 1110 | Fresh. Eng. 1 | 4 |
| MLS 1101 | MLS Orient. 1 | 1 |
| MTH 1106 | Fund. Math. or | 4 |
| MTH 1107 | Func. Calculus | 4 |
| | Elective | 4 |

Quarter 2

| No. | Course | QH |
|----------|---------------------|----|
| BIO 1107 | Anim. Bio. | 4 |
| CHM 1111 | Gen. Chem. 2 | 5 |
| MLS 1102 | MLS Orient. 2 | 1 |
| PAH 1135 | Prof. Dyn. | 4 |
| | Comp. Sci. Elective | 4 |

Quarter 3

| No. | Course | QH |
|----------|---------------|----|
| CHM 1122 | Gen. Chem. 2 | 5 |
| ENG 1111 | Fresh. Eng. 2 | 4 |
| MLS 1112 | Urinalysis | 2 |
| MLS 1212 | UA Lab | 1 |
| | Elective | 4 |

Second Year**Quarter 4****Entire Class**

| No. | Course | QH |
|----------|-----------------|----|
| BIO 1253 | Humn. Physio. 1 | 4 |
| CHM 1264 | Org. Chem. 1* | 5 |
| MLS 1123 | Heme. 1 | 2 |
| MLS 1124 | Heme. 2 | 2 |
| MLS 1171 | Basic Immuno. | 1 |
| MLS 1223 | Heme. Lab | 2 |
| MLS 1271 | Immuno. Lab | 1 |

Quarter 4A**Entire Class**

| No. | Course | QH |
|----------|-----------------|----|
| MLS 1132 | Immunohem. | 3 |
| MLS 1142 | Microbio. 1 | 3 |
| MLS 1152 | Clin. Chem. | 4 |
| MLS 1232 | Immunoh. Lab | 1 |
| MLS 1242 | Microbio. 1 Lab | 1 |
| MLS 1252 | Clin. Chem. Lab | 1 |
| | Elective | 4 |

Quarter 5

| No. | Course | QH |
|----------|------------------|----|
| BIO 1254 | Humn. Physio. 2 | 4 |
| CHM 1265 | Organic Chem. 2* | 5 |
| MLS 1143 | Microbio. 2 | 2 |
| MLS 1243 | Microbio. 2 Lab | 1 |
| MLS 1641 | Parasitology | 2 |
| MLS 1644 | Parasit. Lab | 1 |
| | Elective | 4 |

Third Year**Quarter 6**

| No. | Course | QH |
|----------|-----------------|----|
| BIO 1260 | Genet. & Devel. | 4 |
| MLS 1672 | Immunopath. | 3 |
| PHY 1201 | Physics 1 | 4 |
| PHY 1501 | Physics Lab | 1 |
| | Statistics | 4 |
| | Elective | 4 |

Quarter 7

| No. | Course | QH |
|----------|-----------------------------|----|
| BIO 1261 | Cell Phys. Bio. | 4 |
| ENG 1340 | Writing Wkshp. [†] | 1 |
| MLS 1654 | Adv. Chem. 1 | 4 |
| PHY 1202 | Physics 2 | 4 |
| PHY 1502 | Physics Lab | 1 |
| | Elective | 4 |

*A.S. program (MLT) includes 12 QH of clinical applied study during two quarters of the third year.

Fourth Year**Quarter 8**

| No. | Course | QH |
|----------|-----------------|----|
| MLS 1621 | Adv. Hem. 1 | 3 |
| MLS 1622 | Adv. Hemostasis | 4 |
| MLS 1631 | Adv. Immunohem. | 2 |
| MLS 1648 | Adv. Microbio. | 4 |
| MLS 1655 | Adv. Chem. 2 | 4 |

Quarter 9

| No. | Course | QH |
|----------|------------------------|----|
| | (Clinical Appl. Study) | |
| MLS 1532 | Immunohema AS or | 3 |
| MLS 1552 | Clin. Chem. AS | 7 |
| MLS 1573 | Immuno. 1 AS | 1 |

Fifth Year**Quarter 10**

| No. | Course | QH |
|----------|----------------------------|----|
| MLS 1523 | Hematology AS and | 4 |
| MLS 1544 | Clin. Micro. AS or | 7 |
| MLS 1574 | Immuno. 2 AS | 1 |
| MLS 1890 | U/G Research (optional) | 2 |

Quarter 11

| No. | Course | QH |
|----------|----------------|----|
| MLS 1665 | Med. Lab Mgmt. | 2 |
| MLS 1661 | MLS Education | 2 |
| MLS 1662 | Clinimetrics | 2 |
| MLS 1681 | MLS Sen. Sem. | 2 |
| | Electives | 8 |

*CHM 1268 and CHM 1269 may be substituted for CHM 1264 and CHM 1265.

[†]Upper-division writing requirement can be filled by taking ENG 1340 upon completing 80 QH or substituting a suitable 4 QH writing course.

Elective Distribution Requirements

12 QH of Humanities

8 QH of Social Sciences; 4 QH Prof. Dynamics

16–28 QH of Free Electives; including one computer science and one statistics course.

Specimen Program in Health Record Administration
(Five-Year Cooperative)

First Year

| Quarter 1 | | |
|-----------|---------------------|----|
| No. | Course | QH |
| BIO 1106 | Gen. Bio. | 4 |
| ENG 1110 | Fresh. Eng. 1 | 4 |
| HRA 1100 | Orient. Med. Rec. 1 | 1 |
| MTH 1101 | Bas. Math* | 4 |
| PSY 1111 | Fnd. Psych. 1 | 4 |

| Quarter 2 | | |
|-----------|----------------------|----|
| No. | Course | QH |
| BIO 1107 | Anim. Bio. | 4 |
| MTH 1103 | Bas. Math.* | 4 |
| PAH 1135 | Dynam. of Hlth. Care | 4 |
| | A. & S. Elective | 4 |

| Quarter 3 | | |
|-----------|------------------|----|
| No. | Course | QH |
| BIO 1121 | Intro. Microbio. | 3 |
| ENG 1111 | Fresh. Eng. 2 | 4 |
| PSY 1112 | Fnd. Psych. 2 | 4 |
| | A. & S. Elective | 4 |

Second Year

| Quarter 4 | | |
|-----------|-------------------|----|
| No. | Course | QH |
| BIO 1150 | Hu. Anat. 1 | 5 |
| HRA 1321 | Lang. Hlth. Prof. | 2 |
| SOC 1100 | Intro. Socio. or | 4 |
| SOA 1100 | Anthropology | |
| | A. & S. Elective | 4 |
| | Elective | 4 |

| Quarter 5 | | |
|-----------|---------------------|----|
| No. | Course | QH |
| BIO 1151 | Hum. Anat. 2 | 5 |
| MTH 1150 | Prob. Stat. & Comp. | 4 |
| SPC 1115 | In Comm Skills | 4 |
| | A. & S. Elective | 4 |

Third Year

| Quarter 6 | | |
|-----------|-------------------|----|
| No. | Course | QH |
| HRA 1310 | Hosp. Law | 2 |
| HRA 1320 | Lang. of Medicine | 4 |
| HRA 1330 | Fnd. Med. Sci. 1 | 3 |
| HRA 1410 | Hlth. Rec. Sci. 1 | 4 |
| | Elective | 4 |

| Quarter 7 | | |
|-----------|-----------------------|----|
| No. | Course | QH |
| ENG 1340 | Writing Workshop | 1 |
| HRA 1340 | Fnd. Med. Sci. 2 | 3 |
| HRA 1420 | Hlth. Rec. Sci. 2 | 4 |
| HRM 1432 | Organizational Behav. | 4 |
| INT 1100 | Begin. Computer Use | 4 |

Fourth Year

| Quarter 8 | | |
|-----------|-------------------------------|----|
| No. | Course | QH |
| HRA 1430 | Hlth. Rc. Sc. 3 | 4 |
| HRA 1450 | Appl. Hlth. Rec. Dir. Prac. 1 | 3 |
| HRA 1510 | Mgt. Hlth. Rec. Serv. 1 | 4 |
| HRA 1580 | Train. & Develop. | 2 |
| HRA 1610 | Intro. DP for Health Sci. | 4 |

| Quarter 9 | | |
|-----------|---|----|
| No. | Course | QH |
| HRA 1440 | Hlth. Rec. Sci. 4 | 4 |
| HRA 1460 | Appl. Hlth. Rec. Dir. Pract. 2 (7 days) | 2 |
| HRA 1520 | Mngt. of Hlth. Rec. Service 2 | 4 |
| HRA 1540 | Qual. Assur. | 4 |
| HRA 1630 | Intro. Hlth. Data Res. | 4 |

Fifth Year

| Quarter 10 | | |
|------------|-------------------------------|----|
| No. | Course | QH |
| HRA 1530 | Mgmt. of Hlth. Rec. Service 3 | 4 |
| HRA 1620 | Sys. Analysis | 4 |
| HRA 1640 | Med. Comp. Appl. | 4 |
| | Elective | 4 |

| Quarter 11 | | |
|------------|------------------------|----|
| No. | Course | QH |
| HRA 1471 | Appl. Hlth. Rec. Sc. 3 | 3 |
| HRA 1560 | Sem. Hlth. Rec. | 2 |
| HRA 1570 | Hlth. Rec. Prof. | 2 |
| HRA 1800 | Indep. Study | 4 |
| HRA 1820 | Special Topics 2 | 2 |

*Students may substitute MTH 1106 (4 QH) and 4QH Elective for MTH 1101 and MTH 1103.
HRA 1810 Special Topics 1, 2 QH.
HRA 1820 Special Topics 2, 2 QH.
Assigned by program director.
English 1340 Writing Workshop—Upper-division writing requirement can be filled by taking English 1340 upon completion of 80 QH beginning with the class of 1989.

Specimen Program in Respiratory Therapy BS
(Five-Year Cooperative)

First Year

| Quarter 1 | | |
|-----------|--------------------|----|
| No. | Course | QH |
| BIO 1140 | Bas. Ani. Bio. | 4 |
| CHM 1111 | Gen. Chem. | 5 |
| ENG 1110 | Fresh. Eng. 1 | 4 |
| PSY 1111 | Fund. of Psych. | 4 |
| RTH 1111 | Resp. Ther. Sem. 1 | 1 |

| Quarter 2 | | |
|-----------|--|----|
| No. | Course | QH |
| BIO 1141 | Bas. Ani. Bio. 2 | 4 |
| MTH 1106 | Fund. Math | 4 |
| PAH 1135 | Prof. Dynmics. in the Hlth. Care Deliv. Sys. | 4 |
| RTH 1112 | Resp. Ther. Sem. 2 | 1 |
| | A. & S. Elective | 4 |

| Quarter 3 | | |
|-----------|--------------------|----|
| No. | Course | QH |
| BIO 1120 | Microbio. | 4 |
| CHM 1122 | Gen. Chem. | 5 |
| ENG 1111 | Fresh. Eng. 2 | 4 |
| MTH 1107 | Func. & Bas. Calc. | 4 |
| RTH 1113 | Resp. Ther. Sem. 3 | 1 |

Second Year**Quarter 4**

| No. | Course | QH |
|----------|-------------------|----|
| PAH 1202 | Anat. Physiol. 1 | 5 |
| PSY 1209 | Basic Physics | 4 |
| RTH 1301 | Prof. Prac. Lab 1 | 1 |
| RTH 1331 | Patient Care | 4 |
| _____ | A. & S. Elective | 4 |

Quarter 5

| No. | Course | QH |
|----------|----------------------|----|
| PCL 1309 | Pharmacology | 4 |
| PHY 1204 | Anat. & Physiology | 5 |
| RTH 1211 | Pract. in Resp. Care | 4 |
| RTH 1302 | Prof. Pract. Lab 2 | 1 |
| RTH 1332 | Intro. to Resp. Care | 4 |

Third Year**Quarter 6**

| No. | Course | QH |
|----------|-------------------------|----|
| RTH 1312 | Practicum in Resp. Care | 4 |
| RTH 1320 | Cardiopul. Physiology | 4 |
| RTH 1403 | Prof. Practice Lab 3 | 1 |
| RTH 1414 | Clinical Seminar 1 | 1 |
| RTH 1433 | RC for Med-Surg. Pts. | 4 |
| RTH 1435 | Intro. to Ped. RC | 2 |

Quarter 7

| No. | Course | QH |
|----------|---------------------------|----|
| ENG 1340 | Writing Workshop | 1 |
| RTH 1313 | Practicum in Resp. Care 3 | 6 |
| RTH 1321 | Cardiopul. Disease | 4 |
| RTH 1404 | Prof. Practice Lab 4 | 1 |
| RTH 1415 | Clinical Seminar 2 | 1 |
| RTH 1434 | RC for Critical Pts. | 4 |

Fourth Year**Quarter 8**

| No. | Course | QH |
|----------|---------------------------|----|
| PCL 1410 | Pathology | 4 |
| PHL 1165 | Moral Problems in Med. | 4 |
| RTH 1505 | Cardiopul. Lab Practice | 1 |
| RTH 1573 | Cardiopul. Lab Technology | 4 |
| _____ | Computer Elective | 4 |

Quarter 9

| No. | Course | QH |
|----------|---------------------|----|
| RTH 1576 | Neonatal Resp. Care | 4 |
| _____ | A. & S. Elective | 4 |
| _____ | A. & S. Elective | 4 |
| _____ | Computer Elective | 4 |

Fifth Year**Quarter 10**

| No. | Course | QH |
|----------|-----------------------|----|
| RTH 1578 | Adv. Med. Monitoring | 4 |
| _____ | A. & S. Elective | 4 |
| _____ | Professional Elective | 4 |
| _____ | Professional Elective | 4 |

Quarter 11

| No. | Course | QH |
|----------|-----------------------|----|
| RTH 1574 | Adv. Clin. Physiology | 4 |
| _____ | A. & S. Elective | 4 |
| _____ | Professional Elective | 4 |
| _____ | Professional Elective | 4 |

English 1340 Writing Workshop—Upper-division writing requirement can be filled by taking English 1340 upon completion of 80 QH beginning with the class of 1989.

Specimen Program in Toxicology (Five-Year Cooperative)

First Year**Quarter 1**

| No. | Course | QH |
|----------|--------------|----|
| BIO 1106 | Biology 1 | 4 |
| ENG 1110 | English 1 | 4 |
| MTH 1107 | Fund Math | 4 |
| TOX 1100 | Tox Ori | 1 |
| _____ | A&S Elective | 4 |

Quarter 2

| No. | Course | QH |
|----------|---|----|
| CHM 1111 | Gen Chem 1 | 5 |
| ENG 1111 | English 2 | 4 |
| PAH 1135 | Prof Dynamics in Hlth. Care Deliv. Sys. | 4 |
| PHY 1201 | Physics 1 | 4 |

Quarter 3

| No. | Course | QH |
|----------|--------------|----|
| BIO 1107 | Biology 2 | 4 |
| CHM 1122 | Chemistry 2 | 5 |
| MTH 1108 | Calculus | 4 |
| _____ | A&S Elective | 4 |

Second Year**Quarter 4**

| No. | Course | QH |
|----------|---------------------|----|
| CHM 1264 | Org Chem 1 | 5 |
| MTH 1150 | Math Probs/Stats or | 4 |
| PSY 1211 | Stats in Beh Sci 1 | 4 |
| PAH 1202 | A&P 1 | 5 |
| PHY 1203 | Physics 3 | 4 |

Quarter 5

| No. | Course | QH |
|----------|----------------|----|
| CHM 1265 | Org Chem 2 | 5 |
| PAH 1204 | A&P 2 | 5 |
| _____ | A.&S. Elective | 4 |

Third Year**Quarter 6**

| No. | Course | QH |
|----------|------------------|----|
| PAH 1280 | Biochemistry | 5 |
| PCL 1410 | Pathology | 4 |
| PMC 1418 | Med Chem/Pharm 1 | 4 |
| _____ | A&S Elective | 4 |

Quarter 7

| No. | Course | QH |
|----------|----------------------|----|
| ENG 1340 | Eng Writing Workshop | 1 |
| MLS 1151 | Clin Chem | 5 |
| PCL 1451 | Pharm Lab | 1 |
| PCL 1420 | Pharm/Med Chem 2 | 6 |
| TOX 1300 | Toxicology 1 | 4 |

Fourth Year**Quarter 8**

| No. | Course | QH |
|----------|-------------------------|----|
| CHM 1221 | Anal. Chem. <i>or</i> | 4 |
| PMC 1321 | Pharm. Anal. | 4 |
| PCL 1422 | Pharmacol. Med. Chem. 3 | 6 |
| TOX 1322 | Biochem. Tox. | 4 |
| | A.&S. Elective | 4 |

Quarter 9

| No. | Course | QH |
|----------|-----------------|----|
| BIO 1120 | Microbiology | 4 |
| BIO 1261 | Cell Physiology | 4 |
| TOX 1301 | Toxicology 2 | 4 |
| | A.&S. Elective | 4 |

Fifth Year**Quarter 10**

| No. | Course | QH |
|----------|--------------------|----|
| CHM 1431 | Inst. Analysis | 5 |
| CHM 1461 | Id. Org. Comp. | 3 |
| PCT 1440 | Bio. Pharm./Pharm. | 4 |
| | Elective | 4 |

Quarter 11

| No. | Course | QH |
|----------|-------------------|-----|
| HSL 1506 | Comm. Health | 4 |
| MLS 1341 | Epidemiology | 3 |
| TOX 1302 | Toxicology 3 | 4 |
| | A.&S. Elective(s) | 4-8 |

English 1340 Writing Workshop—Upper-division writing requirement can be filled by taking English 1340 upon completion of 80 QH beginning with the class of 1989.

University College Alternative Freshman-Year Program

Business Track: One-Year Program

Quarter 1

| No. | Course | QH |
|----------|---------------------------------------|----|
| ED 4003 | Int. Language Skills Dev. A | 4 |
| ENG 4013 | Fund. of Eng. 1 | 4 |
| HST 4110 | Hist. Civ. A <i>or</i> Business Req.* | 4 |
| MTH 1000 | Math 1 [†] | 4 |

Quarter 2

| No. | Course | QH |
|----------|---------------------------------------|----|
| ED 4004 | Int. Language Skills Dev. B | 4 |
| ENG 4014 | Fund. of English 2 | 4 |
| HST 4110 | Hist. Civ. A <i>or</i> Business Req.* | 4 |
| MTH 1010 | Math 2 [†] | 4 |

Quarter 3

| No. | Course | QH |
|----------|---|----|
| ECN 4601 | Economics 1 <i>or</i> Directed Elective [‡] | 4 |
| HST 4111 | Hist. of Civ. B | 4 |
| MGT 4110 | Survey of Bus. <i>or</i> Directed Elective [‡] | 4 |
| MTH 1113 | Math for Bus. [†] | 4 |

Note: January admission: same courses offered winter, spring, and summer quarters.

Criminal Justice, Education, or Arts and Sciences Track: One-Year Program

Quarter 1

| No. | Course | QH |
|----------|--|----|
| ED 4003 | Int. Language Skills Dev. A | 4 |
| ENG 4013 | Fund. of Eng. 1 | 4 |
| MTH 1000 | Math 1* | 4 |
| SOC 4010 | Sociology 1 <i>or</i> Directed Elective [‡] | 4 |

Quarter 2

| No. | Course | QH |
|----------|---|----|
| ED 4004 | Int. Language Skills Dev. B | 4 |
| ENG 4014 | Fund. of English 2 | 4 |
| HST 4110 | Hist. Civ. A <i>or</i> Directed Elective [‡] | 4 |
| MTH 1010 | Math 2 <i>or</i> | |
| SOC 4011 | Sociology 2 | 4 |

Quarter 3

| No. | Course | QH |
|----------|--|----|
| ENG 1111 | Freshman Eng. 2 <i>or</i> Directed Elective [‡] | 4 |
| HST 4111 | Hist. of Civ. B | 4 |
| POL 4106 | Intro. to Politics | 4 |
| SOC 4011 | Sociology 2 <i>or</i> Elective | 4 |

Health Sciences Track

Quarter 1

| No. | Course | QH |
|----------|-----------------------------|----|
| CHM 1110 | Pre-Chemistry | 5 |
| ED 4001 | Int. Language Skills Dev. 1 | 2 |
| ENG 4013 | Fund. of Eng. 1 | 4 |
| MTH 1010 | Math. 2 | 4 |

Quarter 2

| No. | Course | QH |
|----------|-----------------------------|----|
| CHM 1111 | Gen. Chem. 1 | 5 |
| ED 4002 | Int. Language Skills Dev. 2 | 2 |
| ENG 4014 | Fund. of English 2 | 4 |
| MTH 1106 | Fund. of Math. | 4 |

Quarter 3

| No. | Course | QH |
|----------|--|----|
| BIO 1140 | Basic Animal Bio. 1 | 4 |
| CHM 1112 | General Chem. 2 | 5 |
| ENG 1111 | Freshman Eng 2. <i>or</i> Directed Elective [‡] | 4 |
| | Directed Elective | 4 |

Quarter 4

| No. | Course | QH |
|----------|---------------------|----|
| BIO 1141 | Basic Animal Bio. 2 | 4 |
| MTH 1107 | Functions & Calc. | 4 |
| | Directed Elective | 4 |

*Eligible students may take HST 4110 in Q1 or Q2. Both MGT 4110 and ECN 4601 may be taken in Q1 or Q2 quarter, but must be completed by Q3.

[†]Mathematics courses will vary depending on placement tests.

[‡]Directed electives are chosen to help students qualify for major intended.

The Writing Center

The Writing Center offers free assistance to all students on any writing projects. Our trained tutors work one-on-one with writers on class assignments or other writing tasks. The Writing Center staff includes specialists in academic essay writing, technical writing, business writing, research and documentation, editing, grammar, English as a second

language, and literary analysis. Students may either drop in at 102 Cahners Hall, 110 The Fenway, or phone ahead for an appointment, 617-437-3086. Most tutoring sessions last half an hour. Regular Writing Center hours are Monday through Thursday, 10 AM to 4 PM. Some evening hours are available.

Middler Year Writing Requirement

The middler year writing requirement (MYWR) is effective for freshmen who entered the University as of fall 1984 and after and for transfer students who entered as of fall 1985 and after. All middlers (that is, students who have earned 80+ quarter hours including nonco-op students) must complete this graduation requirement at Northeastern. Successful completion of Freshman English is a prerequisite to the MYWR. To complete the middler year writing requirement, students must earn a grade of C (2.0) or better in a four-credit writing course or a pass in a one-credit, pass/fail Writing Workshop.

This University requirement is designed to help students improve their writing for major courses and in their workplaces. The four primary courses are therefore interdisciplinary so that students may write in subjects related to their major.

Students should review the information below. For additional information, students may contact the MYWR Office at 433 Holmes Hall, 617-437-3964.

Middler Year Writing Requirement Courses

Primary MYWR courses.

ENG 1350 Intermediate Writing
ENG 1381 Writing for the Professions:
Business Administration
ENG 1125 Technical Writing
ENG 1340 Writing Workshop

Primary MYWR courses recommended by the following colleges.

College of Arts and Sciences
ENG 1350

Boston-Bouvé College of Human Development Professions
ENG 1350 or ENG 1340

College of Business Administration
ENG 1381

College of Computer Science
ENG 1125

College of Criminal Justice
ENG 1350

College of Engineering
ENG 1125 or ENG 1340

School of Engineering Technology
ENG 1340

College of Nursing
ENG 1350

College of Pharmacy and Allied Health Professions
ENG 1340

Important: Colleges have specific guidelines and schedules for options that apply to majors. Students should consult their dean's office or adviser for guidelines.

Special Note

Classes at Northeastern University are scheduled in different modules.

In assessing quarter weights for courses, the following statement applies: *One quarter-hour of credit is equal to 50 minutes of instruction per week, plus two hours of preparation.*

The Scheduling Office, 126 Hayden Hall, maintains all quarter-hour weights for courses. In the event of error in any publication, the academic record will reflect the correct quarter hours applicable to any degree requirement.

Some course titles may change, but the course number remains the same. Be sure you do not register for a course you may have already taken.

Basic College Compensatory Programs

Basic College Compensatory Programs in mathematics and English are for freshmen native speakers of English whose reading, writing, or mathematical skills need to be strengthened.

The University uses one or more of three criteria to determine which freshmen participate in the compensatory programs: precollege academic credentials, tests administered during orientation week, or performance in ENG 1110, Freshman English 1.

In general, the program consists of six courses, each offering four hours of credit. The courses must fit into the following sequences.

| | |
|----------------|------------------------------|
| Fall* | |
| MTH 1000 | Mathematical Preliminaries 1 |
| ENG 1110 | Freshman English 1† |
| or | |
| ENG 1013 | Fundamentals of English 1 |
| ED 1003 | Reading/Study Skills |
| Winter* | |
| MTH 1010 | Mathematical Preliminaries 2 |
| ENG 1014 | Intensive Writing |

Special Notes

Successful completion of Mathematical Preliminaries 1 and 2 is a prerequisite for

| | |
|--|----------------------------------|
| MTH 1101, MTH 1106, MTH 1107, and MTH 1108 | Nonbusiness mathematics sequence |
| MTH 1113 and MTH 1114 | Business mathematics sequences |

A passing letter grade in Freshman English 1 or Intensive Writing is a prerequisite for

| | |
|-------------------|---------------------------------|
| ENG 1111 | Standard Freshman English 2 |
| ENG 1111–ENG 1113 | Engineering sequence |
| ENG 1111–ENG 1114 | Engineering technology sequence |

*The same sequence is offered winter/spring for students who enter in January.
†Students whose work in this course is unacceptable for success in ENG 1111, Freshman English 2, will receive a grade of S and must complete ENG 1014, Intensive Writing.

Schedule for Continuation of Compensatory Programming in the Basic Colleges

Acceptance for credit is determined by the faculties of the individual colleges and is therefore subject to change. The chart below outlines the Basic Colleges' policies on compensatory courses. Asterisked (*) courses are graded pass/fail and therefore are not included in the student's quality/point average. A *yes* designates acceptance for credit, a *no* nonacceptance, and an *n/a* not applicable.

| | English 1 (ENG 1110/ 1013) | English 2 (ENG 1014) | Mathematical Preliminaries* (MTH 1000) | Mathematical Preliminaries 2* (MTH 1010) | Reading Study Skills (ED 1003) |
|---|----------------------------------|-------------------------|--|--|--------------------------------------|
| Arts and Sciences | yes | yes | yes | yes | yes |
| Bouvé: Physical Therapy | yes | yes | no | no | no |
| Bouvé: Physical Education | yes | yes | yes | yes | yes |
| Bouvé: Recreation and Leisure Studies | yes | yes | no | no | no |
| Bouvé: Teacher Preparations | yes | yes | yes | yes | yes |

| | | | | | |
|---|----------------------|-----|------|------|-----|
| Business Administration | yes | yes | yes | yes | no |
| Computer Science† | yes | yes | n/a | n/a | n/a |
| Criminal Justice | yes | yes | yes‡ | yes‡ | yes |
| Engineering† | n/a | n/a | n/a | n/a | n/a |
| Engineering Technology | yes | yes | n/a | n/a | n/a |
| Nursing | yes | yes | no | no | no |
| Pharmacy and Allied Health Professions | yes, but w/o credit§ | yes | no | no | no |

†This college offers MTH 1120 and MTH 1121, a course sequence in college calculus with algebra and trigonometry, to students who test deficient in mathematics. The sequence involves extra work in algebra and trigonometry and covers the same material as the regular freshman calculus sequences.

‡Students whose diagnostic examinations suggest a need for basic mathematics may elect MTH 1000 or MTH 1010 to prepare for MTH 1106, Fundamentals of Mathematics.

§This college will accept ENG 1110 or ENG 1014 for credit only (with a letter grade). Students who complete English courses must still take a four-credit English elective.

Course Descriptions

Chemical Engineering

The course descriptions listed under chemical engineering are intended to show the general scope of the subject that will be covered. Since courses are continually updated, specific topics or methods of approach may vary from term to term. In addition to meeting course prerequisites, students are expected to take each chemical engineering course in the sequence shown on the specimen program sheet.

CHE 1201 Chemical Engineering Calculations 1 4 QH

Examines the application of fundamental laws of mass and energy conservation to chemical and physical processes. Emphasizes material balances. A corequisite computational lab aids students in improving facility in handling problems typical of the course. Lab fee. *Prereq.* CHM 1132 and CHM 1138. *Take concurrently with CHE 1205.*

CHE 1202 Chemical Engineering Calculations 2 4 QH

Continues CHE 1201, emphasizing energy balances and the simultaneous application of mass and energy conservation laws. Considers typical chemical processing industry problems. *Prereq.* CHE 1201.

CHE 1205 Computation Laboratory 2 QH

Offers lab sessions to aid students in problem formulation and solution. The assignments are based on material presented in CHE 1201. Emphasis is placed on computer software applications. Lab fee. *Prereq.* Taken with CHE 1201.

CHE 1211 Chemical Engineering Thermodynamics 1 4 QH

Topics include the first law and its application to batch and flow systems, heat effects in chemicals, and physical properties of real fluids. Applies basic principles and mathematical relations to the analysis and solution of engineering problems. *Prereq.* CHE 1201 and CHE 1205.

CHE 1300 Chemical Engineering Calculations 2 4 QH

Emphasizes energy balances and the simultaneous application of mass and energy conservation laws in steady and unsteady state processes. Problems are selected from chemical processing industry applications. *Prereq.* CHE 1201 and CHE 1211.

CHE 1310 Chemical Engineering Thermodynamics 2 4 QH

Covers thermodynamic properties of mixtures; fugacity and the fugacity coefficients from equations of state for gaseous mixtures; liquid phase fugacities and activity coefficients for liquid mixtures; phase equilibria; the equilibrium constant for homogeneous gas-phase reactions; and extension of theory to handle simultaneous, heterogeneous, and solution reactions. *Prereq.* CHE 1300.

CHE 1320 Momentum Transport 4 QH

Topics include physical properties of fluids, pipe flow for process application, macroscopic balances and their application, and microscopic balances. *Prereq.* CHE 1211 and CHE 1300.

CHE 1410 Experimental Methods 1 4 QH

Explores an experimental approach to solving chemical engineering problems and preparing reports to detail the results and their interpretations. Presents experiments that illustrate the fundamental unit operations. Lab fee. *Prereq.* CHE 1320.

CHE 1411 Experimental Methods 2 4 QH

Continues CHE 1410, requiring more advanced experimentation and more sophisticated reports. Lab fee. *Prereq.* CHE 1410.

CHE 1421 Chemical Engineering Kinetics 4 QH

Topics include fundamental theories of the rate of chemical change in homogeneous reacting systems; integral and differential analysis of kinetic data; design of batch and continuous-flow chemical reactors; and an introduction to heterogeneous reactions and reactor design. *Prereq.* CHE 1310.

CHE 1430 Heat Transport 4 QH

Examines analytical and numerical integration of heat conduction equations; theoretical and empirical determination of film coefficients of heat transfer; natural convection; heat transfer with phase change; overall coefficient of heat transfer; design of shell-and-tube heat exchangers; and single and multiple effect evaporation. *Prereq.* CHE 1320.

CHE 1440 Separation Processes 4 QH

Covers binary flash distillation; analysis of column distillation through internal stage-by-stage balances; McCabe-Thiele graphical method; Analytical Lewis method; staged column design; packed column design; absorption and stripping; and mass transfer analysis. *Prereq.* CHE 1310.

CHE 1450 Chemical Engineering Economics 4 QH

Introduces financial decision-making techniques as applied to problems of production, storage, transportation, and utilization of chemical resources to meet societal needs. *Prereq.* ECN 1115.

CHE 1501 Process Design 1 6 QH

Focuses on the process design of a chemical plant. Topics include process selection, material and energy balances, equipment selection design, elements of instrumentation, flowsheets, and cost estimates. Lab fee. *Prereq.* CHE 1421 and CHE 1440.

CHE 1502 Process Design 2 6 QH

Continues CHE 1501, requires a more complex design and studies additional elements of process design. Lab fee. *Prereq.* CHE 1501.

CHE 1503 Projects 1 6 QH

Offers individual research related to some phase of chemical engineering. Open only to students selected by the department head on the basis of scholarship and proven ability. Lab fee. *Prereq.* Senior standing and consent of department.

CHE 1504 Projects 2 6 QH

Continues the research work begun in CHE 1503. Lab fee. *Prereq.* CHE 1503.

CHE 1511 Mathematical Methods in Chemical Engineering 4 QH

Examines the formulation and solution of problems taken from chemical and engineering studies that require advanced mathematical methods. Emphasizes the formulation step, and discusses numeric and analytic solution techniques for solving sets of algebraic equations and for solving ordinary and partial differential equations. *Prereq.* Senior standing.

CHE 1512 Chemical Process Control 4 QH

Topics include the Laplace transform and its use in solving ordinary differential equations; modeling and computer simulation of basic heat, mass, and fluid-flow dynamics; linearization of nonlinear systems; the transfer function; sensors, transmitters, valves, and controllers; block-diagram algebra; dynamics of higher-order systems; modeling and simulation of control-loop dynamics; frequency response; and Laplace and frequency domain stability analysis. *Prereq.* Senior standing.

CHE 1513 Introduction to Optimization 4 QH

Demonstrates elementary optimization techniques, such as gradient methods, pattern search, linear programming, and dynamic programming, as applied to a variety of elementary physical and chemical problems. *Prereq.* Senior standing.

CHE 1514 Special Topics 4 QH

Presents chemical engineering topics of interest to the staff member conducting the class. *Prereq.* Senior standing.

CHE 1516 Mass Transfer Operations 4 QH

Examines convergence methods applied to bubble and dew-point calculations; equilibrium flash separations; binary and multicomponent batch distillation; binary batch distillation with rectification; McCabe-Thiele method for multiple feeds and side-streams; modified latent heat method in binary distillation; multicomponent distillation, including use of Underwood equations for stage requirement; Fenske-Underwood-Gilliland method for stage requirement; and matrix solution using the theta method of convergence. *Prereq.* Senior standing.

CHE 1517 Analysis of Chemical Processes 4 QH

Focuses on methods and reactions used for making chemical products on a large scale. Topics include types of physical and chemical equilibria, flow-sheet patterns, energy management, and catalytic and non-catalytic rate problems. Studies a number of situations involving simultaneous application of the above topics in process analyses. *Prereq.* CHE 1300, CHE 1421, and senior standing.

CHE 1518 Management in the Chemical Industries 4 QH

Focuses on principles of management as applied to the chemical process industries. Uses case studies to supplement lectures. *Prereq.* Senior standing in engineering.

CHE 1519 Kinetics of Polymerization Process 4 QH

Explores the mechanisms by which polymeric materials are assembled via chemical reaction. Analyzes reaction-rate models based on these mechanisms to investigate the effect of reaction parameters on the chemical and physical structure of the polymeric product. Considers free radical addition, condensation, and ionic polymerization processes. *Prereq.* CHE 1421, CHM 1272, and senior standing.

CHE 1520 Pollution Control in Chemical Industries 4 QH

Studies fundamental operations for handling environmental problems in the chemical process industries. Discusses water quality requirements and industrial waste characteristics. *Prereq.* Senior standing.

CHE 1521 Chemical Process Development 4 QH

Traces the manner in which a chemical process evolves from the research lab to full-scale production using typical processes as illustrations. Topics covered include economic factors, safety factors, batch vs. continuous operation, process evaluation, developing the flow sheet, and scale-up considerations. *Prereq.* Senior standing.

CHE 1523 Catalysis 4 QH

Introduces heterogeneous catalytic processes. Topics include mechanistic explanations, modeling of catalyzed reactions, and the application of catalysts to industrial practice. *Prereq.* Senior standing.

CHE 1530 Biochemical Engineering Fundamentals 4 QH

Presents key concepts in biochemistry, cell biology, enzyme kinetics, and metabolic pathways, offered as an introductory exposure to these topics and not as complete coverage of life science fundamentals. Topics include biological reactor kinetics and design, transport phenomena in bioprocess systems, and process instrumentation/control. *Prereq.* Open to seniors only.

CHE 1777 Honors Adjunct 1 QH

To be added to any 4 QH course in the department when approved by the Honors Committee of The College of Engineering. Once approved, the adjunct information is forwarded to the Honors Office for dissemination to the honors membership. Students may enroll in CHE 1777 an unlimited number of times as it can be adjunct to any chemical engineering course.

Civil Engineering

The course descriptions listed under civil engineering are intended to show the general scope of the subject that will be covered. Since courses are continually updated, specific topics or methods of approach may vary from term to term.

CIV 1210 Structural Mechanics 1 **4 QH**

Topics include statics of particles and rigid bodies in two and three dimensions; analysis of internal forces in trusses and beams; centroids and centers of gravity of lines, area, and volumes; and moments of inertia of areas and masses. *Prereq. MTH 1227 concurrently and PHY 1222.*

CIV 1211 Structural Mechanics 2 **4 QH**

Surveys analysis of stress and strain; mechanical properties of materials; elastic analysis of stresses and deformations of members subject to axial load, torsion, shear, and moment. Introduces column behavior. *Prereq. CIV 1210.*

CIV 1212 Structural Mechanics 3 **4 QH**

Continues CIV 1211. Topics include torsion, general bending, curved members, shear flow, shear center, combined stresses including elastic and plastic behavior, continuation of column buckling. Introduces yield and fracture criteria. *Prereq. CIV 1211.*

CIV 1220 Structural Analysis 1 **4 QH**

Reviews reactions, shear and bending moment diagrams, bar forces in trusses, deflections by virtual work, and moment area methods. Analyzes indeterminate structures by consistent deformations, slope deflection, and moment distribution. *Prereq. CIV 1211.*

CIV 1222 Structural Analysis 2 **4 QH**

Focuses on matrix analysis of indeterminate structures using both flexibility and stiffness approaches. Examines computer applications to analysis of framed structures. *Prereq. CIV 1220.*

CIV 1224 Structural Analysis 3 **4 QH**

Continues CIV 1220. Topics include slope deflection; moment distribution; effects of axial loads; symmetry; antisymmetry; nonprismatic members; influence lines for determinate and indeterminate structures, approximate methods of lateral load analysis; and shear wall action. *Prereq. CIV 1220.*

CIV 1226 Structural Analysis and Design Laboratory **2 QH**

Uses lectures, experimental studies, computation labs, and computer projects to develop students' knowledge of structural behavior and understanding of the design and analysis of structures. *Prereq. CIV 1220 taken concurrently.*

CIV 1240 Design of Reinforced Concrete Structures 1 **4 QH**

Reviews mechanical properties of steel and concrete. Studies behavior and design of reinforced concrete beams for shear, moment, and bond; and design of stocky columns for axial load and moment. Emphasizes strength design. *Prereq. CIV 1220.*

CIV 1241 Design of Reinforced Concrete Structures 2 **4 QH**

Topics include design of slender columns, foundations, and multistory buildings with one-way and two-way floor systems. *Prereq. CIV 1240.*

CIV 1250 Design of Steel Structures 1 **4 QH**

Focuses on design of steel members subject to tension, compression, bending, and combinations of loading; and design of connections, braced frames, and rigid frames. *Prereq. CIV 1220.*

CIV 1251 Design of Steel Structures 2 **4 QH**

Topics include design of steel plate girders, composite construction in bridges and buildings, plastic analysis and design, and the design of high-rise buildings subject to lateral loads. *Prereq. CIV 1250.*

CIV 1295 Structural Design Projects **4 QH**

Capstone structural design course. Consists of a minimum of two projects that consider environmental, social, and economic impact. Discusses the safety requirements of various government agencies. Projects require identification of design loading, assessment of structural stability, material usage, and the reliability of the proposed design. Employs computer-aided designs and verifies the results by approximate methods. Considers and analyzes economics of alternative designs. *Prereq. CIV 1222, CIV 1241, CIV 1251; open to seniors only.*

CIV 1310 Fluid Mechanics **4 QH**

Introduces both the statics and dynamics of fluid mechanics. Topics include properties of fluids; pressure variation in water and air; pressure force on surfaces and submerged bodies, continuity, momentum, and energy principles; dimensional analysis and hydraulic similitude; flow in closed conduits, frictional and local losses in pipes and systems; and problems in steady flow. *Prereq. CIV 1210.*

CIV 1320 Hydraulic Engineering **4 QH**

Covers a variety of topics including pipe networks; water hammer; pumps and pump selection; pipe-pump combinations; flow in open channels, uniform flow, gradually varied flow, and hydraulic jump; drag forces on bodies; principles of hydrology, unit hydrograph, and rainfall-runoff relationships; and some aspects of ground water and well hydraulics. *Prereq. CIV 1310.*

CIV 1340 Environmental Engineering 1 **4 QH**

Focuses on protection and management of the environment. Topics include assessment of environmental quality; introduction to water and wastewater technology; air pollution control; and solid waste management. *Prereq. CHM 1132.*

CIV 1341 Environmental Engineering 2 4 QH

Concentrates on development of fundamental physical, chemical, and biological phenomena of water and wastewater systems with engineering applications in water technology from source to ultimate disposal. *Prereq. CIV 1310 and CIV 1340.*

CIV 1350 Environmental and Hydraulics Laboratory 4 QH

Presents lectures, labs, and field experiments in environmental and hydraulic engineering. Experiments in hydraulics include fluid properties; hydrostatics; drag forces; and flow in pipes, channels, pumps, and turbines. Environmental experiments include physical, chemical, and biological analyses normally used by environmental engineers. Field experiments are coordinated to allow collection of environmental and hydraulic data concurrently. *Prereq. CIV 1340; CIV 1320 concurrently.*

CIV 1370 Air Pollution 4 QH

Focuses on theory and practice related to engineering management of air resources. Surveys microclimate and dispersion of pollutants; atmospheric chemistry; air pollution instrumentation; control of gaseous and particulate emissions; design of air pollution control systems; and biological and chemical aspects of air pollution with emphasis on the toxicological aspects of the environment. Other topics include the physiological effects of aerosols; analysis of organic and inorganic constituents of the atmosphere; and rationale for establishment of air quality criteria and standards. *Prereq. Seniors only.*

CIV 1395 Environmental Design Projects 4 QH

Capstone design course in the field of environmental engineering. Up to six individual design projects are assigned, typically involving water and/or waste treatment, site development, industrial waste handling, chemical treatment, and the modification of existing facilities. Each is given a careful critique. Designs require input relating to environmental protection and impact, economic factors, engineering feasibility, selection from alternatives, and safety consideration. One project requires an oral presentation. *Prereq. CIV 1320, CIV 1341, CIV 1350, open to seniors only.*

CIV 1410 Soil Mechanics 4 QH

Studies soil classification, soil-water phase relations, ground water seepage, consolidation theory, strength properties of soils, stress distributions in soils due to surface loads, and slope stability. *Prereq. CIV 1211 and CIV 1310.*

CIV 1411 Soil Mechanics Laboratory 2 QH

Focuses on lab exercises, including soil classification, seepage, shear strength, consolidation, and triaxial testing. *Prereq. CIV 1410 taken concurrently.*

CIV 1420 Foundation Engineering 4 QH

Topics include subsurface explorations, determination of soil-bearing capacity, design of shallow foundations, pile and caisson foundations, design of retaining walls, anchored bulkheads and braced sheeting, and other selected topics on foundation design and construction. *Prereq. CIV 1410.*

CIV 1430 Geotechnology 4 QH

Introduces the geological sciences as they apply to civil engineering practice. Focuses on the effects of significant geological features on location, design, construction, operation, and maintenance of engineering projects. *Prereq. Juniors and seniors only.*

CIV 1495 Geotechnical Design Projects 4 QH

Capstone design course for those interested in the geotechnical area. Two or more projects involving the various aspects of analysis and design used in geotechnical practice will be done as an individual and/or group effort. The projects will require evaluation of subsurface conditions, identification of critical issues, assessment of environmental impacts, economics, safety, construction sequencing, and construction feasibility. They may also include structural design. Examples include design of foundations for super-structures, temporary earth retaining systems for deep excavations, and permanent earth support walls for deep earthen cuts. *Prereq. CIV 1420, CIV 1550, open to seniors only.*

CIV 1510 Materials 4 QH

Focuses on the structural, chemical, and mechanical properties of materials of importance to civil engineers. Topics include fundamental nature of matter; significance of phase transformations; control of microstructure; and the mechanisms of failure of materials. *Prereq. CHM 1132.*

CIV 1511 Materials Laboratory 2 QH

A lab in which standard tests and equipment are used to determine structural and mechanical properties of materials common to civil engineering practice: concrete, aggregates, steel, wood, asphalt, glass, and others. *Prereq. Taken concurrently with CIV 1510.*

CIV 1530 Transportation Analysis and Planning 4 QH

Covers history and policy issues in urban transportation: characteristics of different urban transportation models; fundamentals of bus and rail transit operations planning; fundamentals of urban highway operation; transportation systems management; and land use and demand modeling. Other topics include environmental impact assessment, citizen participation, data collection, and transportation in developing countries. *Prereq. Juniors and seniors only.*

CIV 1540 Highway Engineering 4 QH

Introduces highway engineering. Topics include administration, economic factors, planning, environmental impacts, geometric design, drainage, and the design of flexible pavements. *Prereq. CIV 1410 and CIV 1620.*

CIV 1550 Construction Management 4 QH

Surveys the construction industry and tasks that must be addressed by construction management, including resource allocation, construction environment, organization, contracts, funding, cash flow, productivity, labor relations, network planning and scheduling, construction accounting, and project control. *Prereq. Seniors only.*

CIV 1595 Transportation Design Projects**4 QH**

Capstone design course in transportation. Projects involve planning/design of modified transportation facilities and services. Topics include demand estimation, highway design, traffic flow, safety, economic and social considerations, environmental impacts, and transit fleet size requirements. Examples of such projects are planning for a new highway, transportation systems management planning for an existing corridor, and design of an intermodal transfer facility. *Prereq.* CIV 1530, CIV 1540, CIV 1640, open to seniors only.

CIV 1620 Engineering Measurements**4 QH**

Considers the mathematics and instrumentation used in land surveying for obtaining measurements of distance, elevation, and direction. Covers the methodology applied for traverses, areas, coordinate systems, horizontal and vertical curves, earthwork, and topographic mapping. *Prereq.* MTH 1124 and PHY 1222.

CIV 1621 Engineering Measurements Laboratory**2 QH**

Examines field problems illustrating and applying the lecture material in CIV 1620, with computer applications. Taken simultaneously with CIV 1620. *Prereq.* GE 1100.

CIV 1625 Civil Computations Laboratory**1 QH**

Students will design and execute applications programs for materials covered in CIV 1640 and other courses for a wide variety of civil engineering problems. Some new civil engineering applications topics will also be investigated. *Prereq.* CIV 1640 taken concurrently and GE 1100.

CIV 1630 Civil Engineering Systems**4 QH**

Covers application of system synthesis and optimization techniques: calculus method, linear programming, network analysis, and dynamic programming. *Prereq.* MTH 1227.

CIV 1640 Applied Probability Theory for Civil Engineers**4 QH**

Topics include applications of probability theory to civil engineering problems, probabilities of events, random variables and distributions, derived distributions, expectation, common probability models, and an introduction to statistics. *Prereq.* MTH 1227.

CIV 1650 Legal Aspects of Civil Engineering**4 QH**

Introduces business law for engineering organizations, including description and evaluation of various types of contracts for engineering services and construction, procedures for submitting bids, procedures for claims, and legal steps to minimize risk exposure, both in United States and international business. *Prereq.* Seniors only.

CIV 1777 Honors Adjunct**1 QH**

To be added to any 4 QH course in the department when approved by the Honors Committee of the College of Engineering. Once approved, the adjunct information is forwarded to the honors office for dissemination to the honors membership. Students may enroll in CIV 1777 an unlimited number of times as it can be adjunct to any civil engineering course.

CIV 1810 Special Topic in Civil Engineering**4 QH**

This is a special course within the field of civil engineering initiated by the appropriate discipline committee and approved by the department. *Prereq.* Permission of instructor.

CIV 1820 Special Project in Civil Engineering**4 QH**

Offers individual study in an area within the field of civil engineering, selected by the student and his or her instructor with approval by the appropriate discipline committee, resulting in a definitive report and an oral presentation. *Prereq.* Outstanding academic performance.

Electrical Engineering

The course descriptions listed under electrical engineering are intended to show the general scope of the subject that will be covered. Since courses are continually updated, specific topics or methods of approach may vary from term to term.

ECE 1171 Electrical Engineering 1**4 QH**

Introduces electric circuit theory. Covers Kirchhoff's laws, loop and nodal analysis, Thevenin's theorem, power and energy, exponential excitation, and the system function. *Prereq.* MTH 1128; not open to electrical engineering majors.

ECE 1215 Circuits and Systems 1**4 QH**

Topics include electric circuit elements, sources, Kirchhoff's laws, Tellegen's theorem, Thevenin's theorem, mesh and node equations, power and energy, linearity and time invariance, response to exponential excitations, and system function. *Prereq.* MTH 1125 and PHY 1223.

ECE 1216 Circuits and Systems 2**4 QH**

Topics include forced and force-free response of networks, singularity response, "pre-box" concept, classical a-c response, application of Laplace transform to circuit problems and determination of initial conditions, and the driving-point and transfer functions of circuits. *Prereq.* ECE 1215.

ECE 1217 Circuits and Systems 3**4 QH**

Demonstrates power and energy, reciprocity, magnitude and phase plots, and n-port network theory. Analyzes frequency domain analysis of circuits, stability considerations; and the concept of state variables for networks, natural frequencies, and eigenvalues. *Prereq.* ECE 1216 and MTH 1225.

ECE 1221 Measurements Laboratory 1 QH

Covers fundamentals of electrical measurements and instrumentation. Topics include electrical characteristics of meter movement and its use in designing ammeters and voltmeters; sources of DC current and voltage and their characteristics; the oscilloscope and its application to the display of waveforms and I-V curves of the two-terminal devices; and the measurements of amplitude, phase, and time interval. Lab fee. *Take ECE 1215 concurrently.*

ECE 1222 Circuits Laboratory 1 QH

Offers experiments in basic circuits and measurement. Topics include AC waveforms and circuits for the measurement of peak, average, and rms values; network theorems, that is, Thevenin and Norton, their application and experimental verification; and null circuits such as the Wheatstone bridge and potentiometer. Discusses characterization of simple LTI circuits including RL, EC, and RLC by investigation of their step response and impulse response. Lab fee. *Take ECE 1216 concurrently.*

ECE 1223 Circuits Laboratory 2 1 QH

Lab experiments include controlled sources sinusoidal excitation of first order RC and second order RLC networks; the determination by measurement of magnitude and phase (Bode) plots; and investigation of the resonance phenomenon. Lab fee. *Take ECE 1217 concurrently.*

ECE 1224 Electronics Laboratory 1 1 QH

Follows from ECE 1346. Experiments include p-n junctions and diodes, regulation and power supplies, transistor biasing and bias stability, and MOS digital circuits. *Prereq. ECE 1346. Take ECE 1347 concurrently.*

ECE 1225 Electronics Laboratory 2 1 QH

Follows from ECE 1347. Experiments designing and verifying basic analog circuit functions utilized in integrated circuits. Advantages inherent to ICs, such as component matching and tracking, are exploited in the circuit building blocks investigated. Studies output power stages, current sources, amplifying stages, and differential amplifiers. Topics include applications to signal amplification, D-to-A conversion, and the extraction of weak signals buried in interference. Lab fee. *Prereq. ECE 1347. Take ECE 1349 concurrently.*

ECE 1226 Discrete Systems Laboratory 1 QH

Utilizes a personal computer to study and explore various aspects of A/D and D/A conversion such as aliasing and quantization and some aspects of discrete Fourier transforms and digital filters. Lab fee. *Take ECE 1333 concurrently.*

ECE 1227 Electromagnetic Fields Laboratory 1 1 QH

Lab designed to support class material related to microwave transmission and radiation. Experiments include microwave transmission line measurements and the determination of the properties of dielectric materials; transmission line length measurement; reflection and impedance measurement of dipole antenna; frequency characteristics of antennas and waveguides; and mutual coupling and radiation pat-

tern determination. Lab fee. *Take ECE 1364 concurrently.*

ECE 1228 Electromagnetic Fields and Energy Conservation Laboratory 2 1 QH

Presents static and quasi-static (low frequency) applications of electromagnetic fields and electromechanical energy conversion. Experiments in electromagnetic fields include measurement of static electric potentials in electrode structures and numerical solution of Laplace's equation and static magnetic field measurements of coil configurations. Experiments in energy conversion include transformers and induction motors. Investigates hysteresis, transformer and motional emfs, and development of electromagnetic torque. Lab fee. *Take ECE 1365 concurrently.*

ECE 1229 Digital Systems Laboratory 1 QH

Introduces some aspects of computer hardware design encountered at the digital logic level. Discusses both combinational logic and sequential logic units. Focuses on MSI devices including multiplexers, decoders, counters, shift registers, PROM, RAM, and ALU. Demonstrates the design of Mealy and Moore sequence detectors and other digital subsystems such as parallel binary divider. Lab fee. *Coreq. ECE 1382.*

ECE 1230 VLSI System Design Laboratory 2 QH

Examines the design, layout, and simulation of digital VLSI circuits using a comprehensive set of CAD tools. Studies layouts of NMOS and CMOS combinational and sequential circuits using either a layout editor or automatic layout generators. Studies functional structures including registers, adders, decoders, ROM, PLAs, counters, RAM, and ALU. Utilizes logic and circuit simulators for the logic verification and timing simulation of designed circuits. Lab fee. *Take ECE 1351 concurrently.*

ECE 1231 Electric Power Laboratory 1 1 QH

Presents a power systems design project encompassing one or more of the following computer studies: transmission line constants, power flow, short circuits, and transient stability. Uses a personal computer to upgrade the design of a small power system. Lab fee. *Take ECE 1472 concurrently.*

ECE 1232 Electric Power Laboratory 2 2 QH

Lab experiments cover topics in electromechanical energy conversion employing the "Faraday Law machine" bench. Studies Faraday's Law, transformers, reluctance and induction motors, and synchronous machines. Lab fee. *Prereq. ECE 1472 and coreq. ECE 1371.*

ECE 1233 Semiconductor Processing Laboratory 2 QH

Covers fabrication and testing of simple MOS integrated circuits. Compares process and device models introduced in ECE 1406 with experimental results during weekly lab sessions. Processing includes oxidation, diffusion, lithography, etching, metallization, and characterization. Fabricated diodes, MOS capacitors and transistors, and simple gates will be electrically characterized. Lab fee. *Take ECE 1406 concurrently.*

ECE 1234 Digital Signal Processing Laboratory 2 QH

Focuses on programming a digital signal processing chip in its native assembly language, and performing input/output operations via A-to-D and D-to-A converters. Studies real time signal processing operations and hardware aspects of DSP systems. Considers applications to digital frequency synthesis, computation of discrete time convolution, speech scrambling through frequency inversion, and design and implementation of both FIR and IIR digital filters. Lab fee. *Take ECE 1456 concurrently.*

ECE 1235 Control Systems Laboratory 1 QH

Lab experiments familiarize the student with the practical aspects of control systems design. Topics include analog computer simulation, digital computer control, and use of a programmable controller. Experiments with PID control and emphasizes computer implementation of feedback compensations. Lab fee. *Take ECE 1420 concurrently.*

ECE 1332 Linear Systems I 4 QH

Focuses on basic concepts and techniques of continuous linear system theory. Topics include system theory in terms of the convolution integral; waveform representation in terms of the Fourier series, Fourier integral, and the bilateral Laplace transform; system concepts in terms of the system function and their application to filters and feedback systems. *Prereq. ECE 1217.*

ECE 1333 Linear Systems 2 4 QH

Topics include historical review and future perspectives of discrete systems; representation of digital signals, sampling, quantization; introduction to digital filters, moving average filters; Z-transforms, inverse Z-transforms; recursive digital filters, stability considerations; and steady-state and transient response. Introduces nonrecursive techniques, the discrete Fourier transform, the fast Fourier transform, and applications to computation of systems transfer functions. *Prereq. ECE 1332.*

ECE 1346 Electronics I 4 QH

Emphasizes the use of solid-state active devices in digital circuits. Introduces binary values, logic operations, flip-flops, and registers from the viewpoint of symbolic logic gates, Boolean algebra and Karnaugh maps. Other topics include solid-state devices for the realization of logic functions; concepts of diodes; BJT and field-effect characteristics leading to the use of such devices in implementing inverters, NAND and NOR gates for T²L, CMOS and NMOS logic families. *Prereq. ECE 1216.*

ECE 1347 Electronics 2 4 QH

Emphasizes the use of transistors, including integrated devices in the design of analog circuits. Topics covered include biasing, linearized incremental model characteristics such as gain and impedance levels, early effect, use of signal flowgraphs and frequency response for single and compound stages, and an introduction to operational amplifiers. *Prereq. ECE 1346.*

ECE 1349 Electronic Design 1 4 QH

Studies the design of analog circuits with emphasis on operational amplifiers. Topics include concepts of feedback, open- and closed-loop gain, effect of feedback on impedance levels, frequency response, and stability and compensation in feedback systems. Introduces ECL from the viewpoint of feedback, followed by an analog/digital design example. *Prereq. ECE 1347.*

ECE 1350 Electronic Design 2 4 QH

Continues ECE 1349. Emphasizes the design of systems involving analog, digital and analog/digital approaches to signal acquisition and processing. *Prereq. ECE 1349.*

ECE 1351 Special Topics in IC Design 4 QH

Offers a structured digital MOS design course in designing, verifying, and fabricating both NMOS and CMOS VLSI integrated circuits. Introduces required design rules and relates them to the fabrication process. Begins design exercises and tutorials with basic inverters and proceeds to the design, verification, and performance of large complex digital logic networks. Develops a simple RD delay model in conjunction with the theory of delays in VLSI systems. Other topics covered include program logic arrays and automatic design tools, shift registers, arithmetic logic units, and memory systems. *Prereq. ECE 1382. Take ECE 1230 concurrently.*

ECE 1363 Electromagnetic Field Theory I 4 QH

Starting with Maxwell's equations, studies the major areas of statics, dynamics, quasi-statics, and material media. Statics covers the study of the electrostatic and magnetostatic fields, including the scalar electric potential and vector magnetic potential. In dynamics, presents Faraday's law and Ampere's law for time-varying electromagnetic fields. Quasi-statics introduces the concept of electromechanical coupling with applications to elementary energy conversion, both electric and magnetic devices. Material media covers the macroscopic model of dielectric materials; the electric polarization and the electric flux density vector; macroscopic model of magnetic materials, magnetization, and magnetic field intensity; and boundary conditions. *Prereq. MTH 1225 and PHY 1223.*

ECE 1364 Electromagnetic Field Theory 2 4 QH

Introduces the applications of electromagnetic field theory. Based on Maxwell's equations for time-varying fields, develops the following areas: waves and energy, including plan wave propagation, waveguides and Poynting's theorem; radiation, with emphasis on spherical waves and elementary scattering and application to antenna design; distributed systems terms of waveguide circuit concepts, transmission lines, and Smith chart techniques. Presents other applications in the optics and acoustics areas. *Prereq. ECE 1363.*

ECE 1365 Electromagnetic Fields and Energy Conversion 4 QH

Focuses on the static and quasi-static solution of the electromagnetic field equations and emphasizes energy conversion and transducers. Topics include electrostatics; dielectric materials and transducers; magnetostatics; magnetic materials and transducers; and magnetic circuits, transformers, and energy conversion concepts applied to DC, synchronous, and induction machines. *Prereq.* ECE 1364.

ECE 1371 Electrical Machines 1 4 QH

Reviews electromagnetic field theory as applied to electromechanics. Discusses magnetic circuits, transformers, and their circuit representations; principles of electromechanical energy conversion (state-variable formulation of electromechanical coupling, singly and multiply excited magnetic-field systems; elementary concepts of rotating machines including transformer emf, speed emf, and torque production); steady-state theory and performance of basic rotating machines such as induction, synchronous, and DC commutator machines through circuit-model concepts. *Prereq.* ECE 1365.

ECE 1372 Electrical Machines 2 4 QH

Covers dynamic behavior of electromechanical devices; transient performance of synchronous machines; synchronous and induction-machine dynamics; and DC machine dynamics. *Prereq.* ECE 1371.

ECE 1379 Transients in Electric Power Systems 4 QH

Introduces transient response in electrical power systems. Topics include lightning; switching; faults; and protection against transient overvoltages. Considers transmission lines, transformers, circuit breakers, surge arresters, and fuses in terms of transient response. *Prereq.* ECE 1333.

ECE 1381 Computer Engineering 1: Introduction to Computer Architecture 4 QH

Presents a view of the architecture of a modern computer; the visible architecture provides the starting point. Assembly language programming is used to develop a foundation on the hardware which executes a program and shows what a compiler, assembler, and linker do and how they interact with the architecture. Explores data structures from a programmatic perspective (static storage, stack, and heap) and from a high-level language perspective (simple data types, and structured data types). Covers several types of computer number systems and arithmetic (2s-complement, IEEE floating point, and logical operations). Includes numerous programming exercises and a software design project to develop working facility with the tools and concepts that underlie the next three computer engineering courses. *Prereq.* GE 1100 or equiv.

ECE 1382 Computer Engineering 2: Design of Digital Logic Machines and Circuits 4 QH

Continues ECE 1381 with a bottom-up view of the design of logic machines, leading to the design of a simple digital computer by the end of the quarter. Covers Boolean switching algebra and gate-count

minimization; combinational design; sequential circuits; state machines; PLA, PAL, and ROM realizations; CPU design, design of the ALU, and control unit design. Introduces CAD logic design tools. Requires a design project using SSI and MSI chips to develop facility in the design and testing of functional digital circuits. Proof of the circuit will be done using the CAD tools. *Prereq.* ECE 1381.

ECE 1383 Computer Engineering 3: Microprocessor-Based Design 4 QH

Focuses on the hardware design for modern microprocessor systems. Topics include microprocessor systems architecture; HP64000 microprocessor development system; support circuits; microprocessor busses; electrical characteristics and buffering; memory systems, memory maps, and address decoding; timing in microprocessor systems; asynchronous and synchronous bus protocols; and troubleshooting microprocessor systems. Covers I/O-port design and interfacing using VLSI devices; parallel and serial ports; communication protocols and synchronisation to external devices; hardware and software handshake; serial communication protocols; and RS 232C, RS 422, and RS 423 serial interface standards. Investigates exception processing and interrupt handlers, interrupt generation, interfacing, and vectoring. Includes comprehensive lab exercises that let groups of three students build a modern microprocessor system and execute a small project that enhances the system with useful hardware or software. *Prereq.* ECE 1382.

ECE 1384 Computer Engineering 4: Hardware and Software for Microprocessor Interfaces 4 QH

Focuses on the interaction of software and hardware necessary to interface microprocessor systems to the real world. Topics include special-purpose I/O devices; timers; D/A and A/D converters; DMA controllers, and disk controllers. Surveys bus design and bus protocols: VME bus, IEEE-488 (GPIB) instrument bus, small computer system interface (SCSI) bus. Analyzes real-time programming: I/O techniques, event-handling delays, and data throughput rates. Considers BIOS, monitors, simple operating systems, multitasking, and memory management. Most of the course is taught in the context of one modern microprocessor, but other microprocessors will also be discussed. Includes several lab exercises and a project implementing hardware and software for a complex microprocessor interface. *Prereq.* ECE 1383.

ECE 1385 Computer Engineering 5: Introduction to Robotics 4 QH

Studies intelligent interactions between machines and their environment with emphasis on sensory (vision)-driven locomotion and manipulation. Examines integration of sensors, manipulators, and computers into intelligent robotic systems. Demonstrates vision, touch, force, position, proximity, and torque sensors and their role in adaptive control of robot movements. Other topics include computational needs of sensory data processing; VLSI implementation of data-driven architectures for low-level

vision; image processing and understanding as a means of developing symbolic models of the visual (sensory) world; manipulator kinematics and dynamics; VLSI controllers for multicoordinate robotic systems; robotic software tools, including high-level language and decision-making functions; and real-time microprocessor networks and control hierarchies within the robot. *Prereq.* ECE 1333, ECE 1382, and ECE 1383.

ECE 1386 Computer Engineering 6: Structure of Large-Scale Computer Systems 4 QH

Studies large-scale computer systems with applications to robotics, communications, artificial intelligence, and interactive computer design. Covers a global overview of distributed and parallel computing systems for problem solving, planning, and massive data processing. Examines special purpose processors that constitute such complex systems including parallel hardware for image processing, industrial data acquisition and control systems, array processors, and knowledge-based systems. *Prereq.* ECE 1384.

ECE 1390 Senior Project Laboratory 1 2 QH

In this course, students work with a faculty adviser on a term project, either experimental or theoretical. *Prereq.* Permission of department.

ECE 1391 Senior Project Laboratory 2 2 QH

Continues the project started in ECE 1390 or it may be a new project. *Prereq.* Permission of department.

ECE 1400 Special Topics 4 QH

Topics covered vary from term to term depending on the interests of the department and the students. *Prereq.* Permission of department.

ECE 1401 Selected Topics In Electronics 4 QH

Covers the description and application of those electronic devices (thyristors, photodiodes) not covered in depth in the regular electronics sequence; electronic subsystems (AFC, shift registers); and systems (navigation systems, telephone switching systems). Most of the presentations are chosen and made by students, but there are also lectures by invited speakers by the instructor. *Prereq.* ECE 1347.

ECE 1406 Semiconductor Devices and Technologies 4 QH

Surveys microelectronics from crystal growth to interconnection and packaging. Topics include crystal growth and epitaxy; silicon oxidation kinetics and film depositions; photolithography; and diffusion and ion implantation. Discusses the p-n junction diode, the diode equation, and p-n junction fabrication. Reviews metalization techniques, metal oxide semiconductor systems, MOS capacitor and MOS transistor, and VLSI fabrication technologies (bipolar nMOS cMOS). *Prereq.* ME 1386.

ECE 1408 Physical Electronics 4 QH

Develops elements of solid-state theory including wave mechanics, crystalline and amorphous solids, statistical mechanics, and electron transport theory to provide background for a thorough understanding of the junction diode. Explores ohmic contacts and Schottky barriers and the ways that these may be

generated in individual and integrated form. Demonstrates how these elements are joined together to form BJTs and JFETs. *Prereq.* ME 1386.

ECE 1420 Control Systems 4 QH

Comprises closely coupled lectures and laboratory experiments. Topics covered include control system concepts, basic components and goals, modeling and mathematical description, transfer function and state variable representations, feedback control system characteristics, system responses, stability of feedback systems, analysis of graphical tools such as root-locus and Nyquist diagram, compensator design based on root-locus and frequency response, and modern control system design. *Prereq.* ECE 1332 and ECE 1347.

ECE 1430 Electrical Engineering Power Laboratory A 1 QH

ECE 1454 Communication Systems 4 QH

Explores signal representations and characterization; characterization of thermal noise in electronic circuits; amplitude modulation and demodulation; frequency and phase modulation and demodulation; pulse modulation; and transmission of digital information. *Prereq.* ECE 1333 and MTH 1384.

ECE 1456 Digital Signal Processing 4 QH

Introduces modern signal processing. Reviews discrete signals and systems; realization structures for digital filters, including direct forms, cascade forms, and parallel forms; digital filter design, including IIR filter design using impulse invariance and bilinear transformation; and FIR filter design using windowing and frequency sampling. Covers fast Fourier transforms; decimation-in-time and decimation-in-frequency; applications to fast convolution; and implementation of DSP algorithms, including finite word length effects, special purpose hardware to applications in speech processing, and spectral estimation. *Prereq.* ECE 1333.

ECE 1462 Advanced Topics in Electromagnetic Field Theory 4 QH

Continues the required courses in field theory. Topics include microwave and waveguide structures; careful development of electromagnetic energy and force concepts; and an introduction to radiation and antenna theory. *Prereq.* ECE 1364.

ECE 1465 Wave Transmission and Reception 4 QH

Discusses the transmission, radiation, and reception of electromagnetic waves at and above radio frequencies. Develops transmission-line theory using Maxwell's equations and the circuit theory approximations. Discusses matched lines, tuning stubs, and loaded transmission lines, together with the theory and applications of the Smith chart. Presents the theory of guided waves in structures of rectangular and circular cross-section followed by the theory of the cavity resonator. Other topics include the linear antenna, radiation fields, directivity, gain, the aperture antenna, and the insulated antenna. *Prereq.* ECE 1364.

ECE 1466 Optics of Photon Devices**4 QH**

Presents the basic optical concepts necessary for an understanding of quantum electronic devices. Analyzes the simple Lorentzian model of the interaction between electromagnetic waves and optical materials, modified to include necessary quantum concepts. Topics include propagation of electromagnetic waves in isotropic and nonisotropic media (crystal optics); reflection and refraction, polarization and double refraction; optical resonance and stability criteria; Gaussian beam propagation; systems with gain; coherent and noncoherent optical sources; and detection of optical signals. Considers specific devices including resonators, amplifiers, and oscillators; modulators and switches; and optical detectors. *Prereq.* ECE 1364.

ECE 1471 Electrical Power Systems 1**4 QH**

Introduces electrical power systems, wherein three-phase circuits are analyzed under balanced steady-state operation. Topics include system elements and their characteristics and interaction; system modeling; and network calculations. *Prereq.* ECE 1333.

ECE 1472 Electrical Power Systems 2**4 QH**

Continues basic studies in electrical power systems. Topics include power system load-flow analysis; symmetrical components and fault calculations; system protection; economic operation of power systems; and an introduction to power system stability. *Prereq.* ECE 1471.

ECE 1474 Power Electronics**4 QH**

Presents the application of semiconductor devices to power supplies and to AC and DC motor drives. Examines power semiconductor devices including silicon-controlled rectifiers (SCR), gate turn-off thyristors (GT), high-power bipolar junction transistors (HPBT), and power MOS field-effect transistors (MOSFET). Reviews characteristics of AC and DC motors and establishes motor drive requirements. Studies applications of rectifiers, inverters, choppers, and cycloconverters. *Prereq.* ECE 1347 and ECE 1365.

ECE 1481 Machine Language and Assembly Language Programming**4 QH**

Focuses on study of the machine and assembly languages of a selected digital computer. Covers machine representation of numbers, characters, and instructions; machine language programming: flow of control, relocatability, input/output instructions, addressing, and instruction modification. Traces symbolic assembly language: macros, literals, and pseudo-instructions. Includes several programming projects. *Prereq.* ECE 1191.

ECE 1482 Programming Systems**4 QH**

Continues ECE 1481. Discusses assemblers, searching and sorting techniques, and macroprocessors loaders. Introduces high-level languages and their compilation, and operating systems. Includes programming projects as an integral part of the course. *Prereq.* ECE 1481.

ECE 1484 Applied Discrete Analysis**4 QH**

Introduces elementary number theory, modern algebra, combinatorial mathematics, and discrete probability theory, including prime numbers, least common multiple, and greatest common divisor. Covers Euclid's algorithm, continued fractions, congruences, groups, rings, fields, Boolean algebra, combinations and permutations, generating functions, random variables, and Markov chains. *Prereq.* MTH 1225.

ECE 1486 Numerical Methods and Computer Applications**4 QH**

Presents numerical techniques used in solving scientific and engineering problems with the aid of digital computers. Topics include modeling and simulating of deterministic and probabilistic systems; theory of interpolation; iteration methods; numerical solution of ordinary and partial differential equations; signal detection; and use libraries of scientific subroutines. Chooses representative problems for solution on a digital computer. *Prereq.* ECE 1332 and GE 1100.

General Engineering

The course descriptions listed under general engineering are intended to show the scope of the subject that will be covered. Since courses are continually updated, specific topics or methods of approach may vary from term to term.

GE 1100 Computer for Engineers**4 QH**

Uses computers to solve engineering problems emphasizing "structured programming" and Pascal. Explores methods of forming and testing an algorithm; introduces software design methods, forming a subprogram and communicating with a subprogram. Topics include establishing and manipulating tables, arrays and matrices, demonstrating how to use a typical numerical methods package—the Turbo Toolbox—to solve advanced engineering problems. Lab fee.

GE 1110 Engineering Graphics and Design**4 QH**

Examines manual and computer methods for depicting three-dimensional objects. Presents the orthographic projection system using principal and auxiliary views; analysis of drawings; fundamentals of manufacturing processes; and dimensioning practice. Emphasizes engineering design of components and systems, and computer graphics using software packages. Requires writing programs as an introduction to computer-aided design and manufacturing, and preliminary to design engineering. Lab fee.

Industrial Engineering

The course descriptions listed under industrial engineering are intended to show the general scope of the subject that will be covered. Since courses are continually updated, specific topics or methods of approach may vary from term to term.

IIS 1111 Engineering Software

1 QH

Demonstrates the use of a programming language (Pascal) and Turbo Toolbox in solving mathematical problems, as well as the use of commercially available software for solving engineering problems. Provides practical examples of engineering applications, and lab assignments further illustrate the use of available software in engineering applications.

IIS 1200 Work Design

4 QH

Topics include the engineering design process, principles of work physiology, and workplace design from the standpoint of employee safety and effectiveness. Covers work measurement techniques, including direct measurement, synthetic standards, and work sampling. Includes a project in which principles of work design must be applied.

IIS 1300 Probabilistic Analysis for Engineers

4 QH

Presents probability theory axiomatically, with emphasis on sample space representation of continuous and discrete random variables. Covers standard distributions, expectation, transform techniques, and change of variable. *Prereq.* Integral and differential calculus.

IIS 1310 Statistics 1

4 QH

Examines the definition of a statistic; distributions of random variables, including normal, T, chi-square, F, Poisson, and binomial; estimation of parameters; point estimation by method of moments; maximum likelihood; interval estimation; hypothesis testing; and chi-squared goodness-of-fit tests. *Prereq.* IIS 1300.

IIS 1320 Statistics 2

4 QH

Topics include linear regression, analysis of variance, and nonparametric tests. Utilizes computer software to solve linear regression applications. *Prereq.* IIS 1310.

IIS 1330 Principles of Computation and Programming 1

4 QH

Reviews algorithms, computers, and programming; machine language programming (instruction, execution, and addressing techniques); coding and representation of data; program debugging and verification. Surveys machines, devices, and languages. *Prereq.* Higher-level language.

IIS 1340 Operations Research 1

4 QH

Topics include deterministic models, including LP and duality; transportation and allocation; sensitivity and post-optimality analyses; and network analysis, including maximal flow, shortest route, and PERT. *Prereq.* MTH 1227.

IIS 1341 Operations Research 2

4 QH

Focuses on the stochastic models in operations research and their analytical development and solution. Topics include queuing models, deterministic and stochastic inventory models, Markov chains, and sequencing. Presents dynamic programming and recursive functional expressions. *Prereq.* IIS 1310.

IIS 1345 Management Information Systems

4 QH

Examines the design and implementation of computer-based information systems. Topics include the value of information; tools of system analysis and design; impact of computer-based information systems on organizations and society; rudimentary computer architecture; input devices; data organization and storage; system configuration; communications; and output/display devices.

IIS 1350 Digital Simulation Techniques

4 QH

Covers model development, validation, and experimentation for discrete event simulation models. Topics include problem formulation, data collection and analysis, random variable generation, and statistical analysis of output. Utilizes a major simulation language such as GPSS, SIMAN, or SIMSCRIPT. *Prereq.* Higher-level language.

IIS 1360 Engineering Economy and Statistical Decisions Theory

4 QH

Familiarizes the student with the theory and techniques of economic evaluation of an investment project. Presents introductory steps in the analysis of investment proposals, time value of money, and cash flows. Analyzes deterministic and stochastic cash flows in terms of present worth, annual cost, rate of return, and benefit/cost ratio. Studies decision tree for sequential decisions, criteria for decision making under uncertainty, utility theory, value of information, effect of accounting procedures, and taxes on investment analysis. *Prereq.* IIS 1300.

IIS 1366 Engineering Economy

4 QH

Topics include the formulation of analytical techniques, such as, rate of return, present worth, and annual cost. Considers the application of these techniques to solve business and engineering problems involving design, selection, replacement, lease-buy decisions, and decisions among multiple alternatives. Introduces sensitivity analysis and basic probability in cases where uncertainty exists. Surveys sources and costs of capital, debt-versus-equity financing, and leverage. *Not open to Industrial Engineering majors.*

IIS 1400 Systems 1**4 QH**

Examines modeling, analysis, and control of linear feedback systems through consideration of the following topics: differential equations as system models; transfer functions and block diagrams; system components and the method of analogies; accuracy, and stability. *Prereq.* MTH 1225.

IIS 1401 Design Project**4 QH**

Examines analysis and design of major industrial engineering systems. Students are expected to undertake up to five projects drawn from line balancing, job shop scheduling, stochastic network analysis, reliability in design, complex queuing system design, sequencing, or other areas of student and faculty interest. *Prereq.* IIS 1300, IIS 1340, and IIS 1350.

IIS 1405 Production and Inventory Control**4 QH**

Explores basic inventory models and inventory management systems, single-stage and multi-stage systems and their dynamics, production control and aggregate planning, and mathematical and heuristic approaches to aggregate scheduling. Topics include cost structure and decision-oriented analyses, and consideration of job shop scheduling and dispatching problems. *Prereq.* IIS 1300.

IIS 1415 Facilities Design**4 QH**

Examines the use of descriptive and optimizing models (for example, simulation, queuing theory, and linear programming) to design facilities and associated materials-handling systems. Applies computer-assisted layout analysis techniques to problems of real-world scope. *Prereq.* IIS 1340.

IIS 1425 Material Handling System Design**4 QH**

Discusses the design and analysis of large material-handling systems. Topics include computer control of handling systems, integration with production and inspection, automated storage/retrieval systems, automatic identification systems, and systems acquisitions. *Prereq.* IIS 1340.

IIS 1436 Introduction to Quality Control**4 QH**

Covers basic principles to state-of-the-art concepts and application of statistical process control. Applies principles to a variety of products. Topics include measuring and controlling product quality, Shewhart control charts, quality cost, pareto analysis, discrete and variable sampling, and military standards in quality control.

IIS 1440 Total Quality Control (TQC)**4 QH**

Introduces the principles of total quality control (TQC). Examines Japanese methods for controlling technologies in the manufacturing, electrical, steel, construction, and automobile industries. Studies the seven statistical methods of TQC: histograms, cause and effect diagrams, check sheets, Pareto diagrams, graphs, control charts, and scatter diagrams. Includes case studies of TQC implementation in engineering systems and guest lectures by invited authorities. *Prereq.* Junior or senior standing.

IIS 1441 Engineering Reliability/Risk Analysis**4 QH**

Examines principles of reliability and risk analysis of large engineering systems, for example, chemical and electric power plants, dams, manufacturing systems, mechanical, and electrical systems. Discusses failure modes and effects analysis (FMEA tables), reliability block diagrams, success and fault trees, and Bayesian analysis methods. Other topics include the redesign of systems for improved safety, productivity, and availability. Guest lecturers will speak on various case studies from each field of engineering. *Prereq.* IIS 1300 or equiv. or permission of instructor.

IIS 1450 Expert Systems**4 QH**

Introduces students to the theory, topics, and applications of expert systems in engineering. Topics include knowledge representations formats (production rules, frames, networks, and logic systems), heuristics in engineering (deterministic and non-deterministic), fuzzy logic, certainty factors, cognition, memory, decision strategies, design of expert systems, shells, current research goals, and applications in engineering. Each student must complete a term project in expert systems development and/or application. *Prereq.* GE 1100, IIS 1300, IIS 1330, or permission of instructor.

IIS 1465 Microprocessor Applications**4 QH**

Analyzes system architecture of several microcomputers, including microprocessors, bus design, multichip operation, and current trends in processors (8-, 16-, and 32-bit). Discusses interfacing problems and hardware including sensors, actuators, D/A and A/D converters, data transmission, and parallel/serial I/O. Other topics include real-time programming with case studies; network and distributed processing; and development techniques and current state of the art trends. *Prereq.* IIS 1455, assembly language, or permission of instructor.

IIS 1466 Automation**4 QH**

Familiarizes students with the process of manufacturing and potential for automation. Studies designing for automation including required hardware and software. Involves hands-on experience with robotics programming and implementation, programmable control programming, and CNC machine programming using APT and G code. *Prereq.* IIS 1330 and IIS 1465 or permission of instructor.

IIS 1470 Human Considerations in Engineering Design**4 QH**

Introduces human factors with emphasis on the physiological and anthropometric bases of equipment and workplace design. Topics include an overview of the field of human factors; work, fatigue, and endurance; thermal regulation and heat stress; biomechanics; effects of aging on work capacity; and body response to vibration.

IIS 1475 Human Factors**4 QH**

Emphasizes human sensory/motor performance, information-processing capabilities, learning, and skilled-task performance. Topics include an introduction to the experiment as a source of knowledge of human performance characteristics; vision, visual performance, and principles of display design; audition, noise, hearing damage, and auditory signals; information processing; signal detection; aging effects; and system development.

IIS 1480 People in Organizations**4 QH**

Utilizes case studies and focuses on the influence of human behavioral factors on organizational performance. Analyzes research evidence to aid in understanding and anticipating the response of organizational members to management practices. Topics include current theories of organization; motivation; group dynamics and the face-to-face work group; leadership; cognitive aspects of decision making; work enrichment and job satisfaction; and job evaluation. *Prereq. Seniors only.*

IIS 1777 Honors Adjunct**1 QH**

To be added to any 4 QH course in the department when approved by the Honors Committee of the College of Engineering. Once approved, the adjunct information is forwarded to the Honors Office for dissemination to the honors membership. Students may enroll in IIS 1777 an unlimited number of times as it can be an adjunct to any industrial engineering course.

IIS 1800 Independent Study in Industrial Engineering**4 QH**

Independent study on advanced IE topics for students usually in the senior year and with high scholastic standing. Projects may be of an applied or theoretical nature. A formal report is submitted to student's project supervisor at the end of quarter.

Mechanical Engineering

The course descriptions listed under mechanical engineering are intended to show the general scope of the subject that will be covered. Since courses are continually updated, specific topics or methods of approach may vary from term to term.

ME 1111 Key Ideas in Engineering**1 QH**

Introduces first-year students to engineering as a creative practice. Discusses the relationship between engineering and science, and between engineering and economic activity. Explores the challenge, necessity, and satisfaction of lifelong learning in an engineering career.

ME 1201 Statics**5 QH**

Examines vector representation of force and moment; equivalent force systems; centroids and centers of gravity; and distributed forces. Investigates equations of equilibrium; free-body diagrams; applications to trusses, pin-connected frames, and beams; shear and moment diagrams; and elementary concepts in friction. Introduces virtual work. *Prereq. PHY 1222.*

ME 1202 Dynamics I**5 QH**

Develops problem-solving ability in the fundamentals of dynamics. Topics include kinematics of particles, kinematics of rigid bodies, and mass moments of inertia. Examines kinetics of particles and rigid bodies using force, mass, and acceleration. *Prereq. ME 1201.*

ME 1203 Strength of Materials I**5 QH**

Explores the concept of stress and strain; state of stress and strain at a point; and stress-strain relations and material properties. Investigates moment of inertia of areas; stress and deformation of simple members under axial and torsional loads; and stresses in symmetrical beam bending. Involves lab sessions to support the lectures. *Prereq. ME 1201.*

ME 1314 Strength of Materials 2**4 QH**

Topics include asymmetrical bending; analysis of determinate and indeterminate beams by various methods; and buckling of columns. *Prereq. ME 1203.*

ME 1315 Dynamics 2**4 QH**

Continues development of problem-solving ability in dynamics. Topics include kinematics of rigid bodies using rotating frames, kinetics of particles and rigid bodies using work and energy, introduction of Lagrange's equations, kinetics of particles and rigid bodies using impulse and momentum, and simple gyroscopic motion. *Prereq. ME 1312.*

ME 1320 Dynamics for Civil Engineers**4 QH**

Topics include kinematics, translating reference frames, mass moments of inertia, plane motion of rigid bodies, and instantaneous equations of motion. *Prereq. CIV 1210.*

ME 1321 Mechanics for Electrical Engineers**4 QH**

Focuses on the study of kinematics and kinetics of rigid bodies, instantaneous equations of motion, work and energy, and impulse and momentum. *Prereq. PHY 1222.*

ME 1335 Mechanical Design**5 QH**

Covers applications to the design process of the basic concepts of mechanics, strength of materials, and mechanical behavior of materials. Discusses basic considerations in design and its open-ended nature. Reviews fundamentals of stress and deflection analysis; theories of failure; design for fatigue strength; product liability; numerical methods in

design, modeling, simulation; and optimization of mechanical systems. *Prereq.* ME 1314.

ME 1336 Design Project 1

5 QH

Applies the engineering sciences to the design of a system, component, or process. Students will choose the particular design project with the approval of appropriate faculty. Design teams will be organized. Each project will include the use of open-ended problems, development and use of design methodology, formulation of design problem statements and specifications, consideration of alternative solutions, feasibility considerations, and detailed system descriptions. It should include realistic constraints (such as economic factors, safety, reliability, maintenance, aesthetics, ethics, and social impact). *Prereq.* ME 1335 and ME 1337.

ME 1337 Thermal Design

5 QH

Focuses on developing the ability of the students to synthesize their knowledge and understanding of the concepts of thermodynamics, fluid mechanics, and heat transfer to meet the specifications of various thermal design objectives through the assignment of open-ended problems. Reviews fundamentals of heat transfer and fluid mechanics, numerical methods in heat transfer, heat transfer analysis of heat exchangers, heat exchanger pressure drop analysis, modeling, system simulation, and topics in optimization. One or more design projects are assigned. Utilizes various software on mainframe and microcomputers throughout the course and in the projects. *Prereq.* ME 1365.

ME 1338 Design Project 2

5 QH

Continues the project started in ME 1336. Students remain in the same group and under the direction of the same faculty advisers as in ME 1336. *Prereq.* ME 1336.

ME 1340 Thermodynamics

4 QH

Thermodynamics is the study of systems in which energy and its flow across systems boundaries are important. In this course, energy, heat, and work are defined and used in the First Law of Thermodynamics. Introduces other thermodynamic properties and equations of state, with emphasis on tabular and graphical forms for simple compressible systems and on the ideal gas. Introduces the Second Law of Thermodynamics and the property entropy, and discusses their macro- and microscopic implications. Concentrates on basic concepts and their proper application to representative engineering systems. *Prereq.* MTH 1223, not open to ME or ECE power majors.

ME 1360 Thermodynamics I

5 QH

Thermodynamics is the study of systems in which energy and its flow across systems boundaries are important. Defines energy, heat, and work in the First Law of Thermodynamics. Introduces other thermodynamic properties and equations of state, with emphasis on tabular and graphical forms for simple and compressible systems on the ideal gas. Discusses phases and phase transitions, and examines energy analysis of both open and closed systems. Introduces macro- and microscopic implications of the Second

Law of Thermodynamics and the property entropy, and discusses their macro- and microscopic implications. Emphasizes the macroscopic consequences of irreversibility and the limitation this places, through the Second Law, on the behavior of engineering systems. This course meets four times weekly and integrates problem-solving strategies while concentrating on basic concepts. *Take MTH 1223 concurrently.*

ME 1361 Thermodynamics 2

5 QH

Studies of vapor power systems including the Rankine cycle and its modifications for use with both fossil and nuclear fuels, vapor refrigeration systems, and all-gas cycles including the Brayton cycle and its modifications; the Otto cycle; the Diesel cycle; and supercharging and turbocharging. Introduces the concepts of availability and irreversibility and thermodynamics of nonreacting mixtures with applications to air/water/vapor mixtures for air-conditioning systems and cooling towers. *Prereq.* ME 1360.

ME 1362 Thermodynamics 3

5 QH

Continues the thermofluids sequence. Topics include thermodynamic relations using generalized charts; reacting gas mixtures and combustion; and chemical equilibrium. Introduces one-dimensional compressible flow, including isentropic flow with area change; normal shock waves; flow through a constant area duct with friction; and heating. *Prereq.* ME 1361.

ME 1365 Heat Transfer

5 QH

Studies the theories that describe conduction, convection, and thermal radiation heat transfer mechanisms. Discusses steady-state and transient conduction problems in rectangular, cylindrical, and spherical coordinate systems. Studies convective heat transfer mechanisms, and introduces various correlations. Presents a description of thermal radiation heat transfer between surfaces. Includes various lab experiments. *Prereq.* ME 1360, ME 1375, and MTH 1226.

ME 1375 Fluid Mechanics

5 QH

Studies fundamental principles in fluid mechanics. Topics include hydrostatics (pressure distribution, forces on submerged surfaces, and buoyancy); Newton's law of viscosity; acceleration of fluid particles; streamlines; integral formulation of basic laws (conservation of mass, momentum, and energy); differential formulation of basic laws; laminar flow analyses; laminar and turbulent flows; and pipeline analysis. *Prereq.* ME 1360 and MTH 1225.

ME 1380 Materials Science

5 QH

Introduces materials science for engineers, emphasizing the structure/property/function relation. Topics include crystallography, structure of solids, imperfections in crystals, phase equilibrium, phase transformations, diffusion, and physical/electrical properties. Includes a lab. *Prereq.* CHM 1132 and ME 1360.

ME 1386 Materials Science

4 QH

Introduces materials science for engineers, emphasizing the structure/property/function relation. Topics include crystallography, structure of solids,

imperfections in crystals, phase equilibrium, electrical and magnetic properties of metals, semiconductors and junctions. *Prereq.* CHM 1132.

ME 1392 Measurements and Analysis

5 QH

Examines design of experiments, instrumentation, measurements, data analysis, and report writing. Applies the principles developed in class to a variety of lab experiments. Requires written reports. Topics include force, strain, rotational frequency, temperature, pressure, power, and A/D conversion techniques. Lab fee. *Prereq.* None.

ME 1401 Applied Elasticity

4 QH

Topics include analysis of curved beams, rings, and thick-walled pressure vessels; introduction to plane elasticity problems using rectangular and polar coordinate systems; and concepts of stress and strength. *Prereq.* ME 1314.

ME 1408 System Analysis and Control

4 QH

Explores the theoretical background necessary to analyze and design simple linear control systems. Focuses on system modeling, linear approximations and their limitations, transfer functions, and block diagrams; transient and frequency response; and stability. Discusses frequency domain and root locus techniques. *Prereq.* ME 1312.

ME 1410 Design for Space Applications

4 QH

Studies Keplerian motion and transfer dynamics using Battin's solution. Considers optimization of transfer dynamics with respect to our solar system; and mass optimization, boost, and reentry dynamics. Utilizes integrated design throughout the course. *Prereq.* ME 1315.

ME 1415 Mechanical Vibrations

5 QH

Studies one-, two-, and multi-degrees of freedom systems using classical, energy, Laplace, matrix, and computer techniques. Includes lab demonstrating vibration measurement. *Prereq.* ME 1202.

ME 1430 Aspects of Forensic Design

4 QH

Utilizes case studies in which students assume various investigative and court room roles, including (for both plaintiff and defendant) expert witnesses, lawyers, field and office engineers, and jury discussion. Examines consumer protection accidents, the effect of changing standards and codes, classes of mechanical systems normally involved in consumer cases, the methodology of technical questioning, and writing and presenting expert reports. *Prereq.* ME 1335 and ME 1337.

ME 1435 Computer-Aided Design

4 QH

Introduces the concepts of computational and numerical geometry for design. Includes the implementation of computer graphics in design and use of computer-aided design packages. Covers principles of numerical control techniques to design and manufacture. Requires a design project. *Prereq.* GE 1100 and ME 1314.

ME 1436 Advanced Computer-Aided Design

4 QH

Covers advanced applications of interactive graphics concepts to different engineering tasks including animation; solid modeling; numerical control; mass

properties; finite element modeling and analysis; and other traditional engineering analysis. Presents advanced concepts and features of interactive graphics and analysis programming languages. Includes FORTRAN interface and CAD/CAM packages to give students hands-on experience in lab settings. Requires a design project. *Prereq.* ME 1435.

ME 1470 Fluid Mechanics 2

4 QH

Topics include velocity potential and stream functions; circulation and Kelvin's theorem; two-dimensional, steady irrotational incompressible flow; and Karman-Pohlhausen method applied to two-dimensional boundary layers. *Prereq.* ME 1375.

ME 1473 Gas Dynamics

4 QH

Focuses on application of the principles of fluid mechanics to compressible flows. Discusses wave propagation and the concepts of sound speed and Mach number. Emphasizes one-dimensional steady flows including the effects of area change, friction, and heat transfer. Considers normal shock waves and the possibility of choking. *Prereq.* ME 1375.

ME 1480 Mechanical Behavior of Materials

4 QH

Studies the physical basis for the mechanical behavior of solid materials, including elasticity, plasticity, viscoelasticity, and fracture. Discusses structural alloys and polymers. *Prereq.* ME 1203 and ME 1380.

ME 1483 Materials Processing

4 QH

Surveys the essential features and materials limitation of various methods for processing materials. Topics include heat treatment (ferrous and nonferrous alloys), casting, forming, joining, and machining. *Prereq.* ME 1380.

ME 1490 Special Topics

4 QH

When offered, topics will vary depending on the previously expressed interests of a group of students and/or of the department. *Permission of the department.*

ME 1496 Mechanical Engineering Project 1

4 QH

Involves a project of an analytical or experimental nature. Each student must, before the end of the second week of the quarter, obtain written approval for a proposed project from a department faculty member under whom the student will work. It is suggested that approval be secured before registration. A formal report must be submitted to the faculty supervisor at the end of the quarter. *Prereq.* ME 1390; *cannot be taken simultaneously with ME 1495 or ME 1497.*

ME 1497 Mechanical Engineering Project 2

4 QH

If a project initiated under course ME 1496 is large enough in scope, a second project course may be taken with the approval of the faculty supervisor. A formal report must be submitted to the student's faculty supervisor at the end of the quarter. *Prereq.* ME 1496; *cannot be taken simultaneously with ME 1495 or ME 1496.*

ME 1541 Nuclear Engineering 1

4 QH

Studies nuclear physics emphasizing atomic and nuclear structure, and radioactive decay and nuclear reactions, with particular attention to fusion and

fission. Examines health physics, nuclear instrumentation, and the production and uses of radioactive isotopes. Compares thermal, fast, and breeder reactor types prior to a discussion of neutron interactions and their slowing down. Develops the four-factor formula and diffusion equation as applied to one-group theory for bare and reflected thermal reactors. Discusses flux shaping as well as energy production and distribution within the core. *Prereq.* ME 1361.

ME 1542 Nuclear Engineering 2 4 QH
Focuses on development of two-group theory for thermal reactors and considers the physics and safety of fast reactors. Discusses the effect of reactivity change, either intentional or accidental, as well as changes due to temperature, fission product build-up, xenon build-up after shutdown, and fuel depletion. Explores reactor design considerations involving the interrelation of reactor physics, reactor engineering control, distribution of power, and fuel cycle management. *Prereq.* ME 1541.

ME 1545 Internal Combustion Engines 4 QH
Presents the concepts and theories of operation of internal combustion engines based upon the fundamental engineering sciences of thermodynamics, gas dynamics, heat transfer, and mechanics. Discusses the design and operating characteristics of conventional spark-ignition, compression-ignition, Wankel, and stratified charge spark-ignition engines. Includes performance analysis using computer programs and Newhall-Starkman charts. *Prereq.* ME 1361.

ME 1580 Engineering Materials 4 QH
Discusses the utilization of materials science in the application and selection of materials. Topics include reactions with environment, such as oxidation and corrosion; materials selection criteria; and materials engineering case studies dealing with materials selection and failure analysis. *Prereq.* ME 1380.

ME 1702 Dynamics 1 (Honors) 5 QH
This course is identical to ME 1202. The honors section will meet as a separate recitation section for additional lectures and other activities related to the theory and applications of dynamics. *Prereq.* ME 1201.

ME 1703 Strength of Materials 1 (Honors) 5 QH
This course is identical to ME 1203. The honors section meets separately for lab and other activities related to the theory and applications of strength of materials. *Prereq.* ME 1201.

ME 1760 Thermodynamics 1 (Honors) 5 QH
This course is identical to ME 1360. The honors section will meet as a separate recitation section for additional lectures and other activities related to the theory and applications of thermodynamics. *Take MTH 1223 concurrently.*

ME 1765 Heat Transfer (Honors) 5 QH
This course is identical to ME 1365. The honors section meets separately for lab and other activities related to the theory and applications of heat transfer. *Prereq.* ME 1360, ME 1375, and MTH 1226.

ME 1777 Honors Adjunct 1 QH
To be added to any 4 QH course in the department when approved by the Honors Committee of the College of Engineering. Once approved, the adjunct information is forwarded to the Honors Office for dissemination to the honors membership. Students may enroll in ME 1777 an unlimited number of times as it can be an adjunct to any mechanical engineering course.

ME 1780 Materials Science (Honors) 5 QH
This course is similar to ME 1380. The honors section meets separately for lab and other activities related to the theory and applications of materials sciences. *Prereq.* CHM 1132 and ME 1360.

ME 1796 Mechanical Engineering Project 1 (Honors) 4 QH
Involves an analytical or experimental project. Open only to students who are in the Honors Program or by approval of the department chair. Before registration, each student must obtain written approval for a proposed project from a department faculty member under whom the student will work. A formal report must be submitted to the faculty supervisor at the end of the quarter. *Prereq.* All required courses through quarter 9.

ME 1797 Mechanical Engineering Project 2 (Honors) 4 QH
This course continues ME 1796. Before registration, each student must obtain written approval of the department chair. *Prereq.* All required courses through quarter 9.

Computer Science

COM 1100 Fundamentals of Computer Science 4 QH
Introduces computers and computer programming via a brief overview of text editing and system commands. Reviews basic concepts of a high-level language: data types, variables, assignment, expressions, statements, and input/output. Surveys the tools of structured programming: flow control constructs, use of procedures and functions, parameters and local variables, and user-defined data structures. Other topics include strings, arrays, record structures, and keyboard/screen input/output.

Emphasizes the systematic design of programs using structured components.

COM 1101 Algorithms and Data Structures 1 4 QH
Introduces algorithms, data structures, abstraction, and modularization; elementary searching and sorting; sequential files: text and binary; and the use of recursion to express algorithms. Covers the use of pointers to create linked structures; singly and doubly linked lists and circular lists; sorted insert into lists; and stacks and queues treated using both arrays and linked lists. *Prereq.* COM 1100 or COM 1108.

COM 1102 Symbolic Programming and its Applications 4 QH

Introduces the fundamental concepts and applications of functional programming and their relationship to computer science. Reviews basic ideas underlying symbolic information processing and the role of LISP in this context. Covers applications selected from artificial intelligence, programming language design and implementation, procedural and data abstraction, and development of data-driven programs. *Prereq.* COM 1101.

COM 1105 Computer Science and its Applications 4 QH

Provides an opportunity for students of all majors to understand and experience the field of computer science and to become informed and intelligent users of the tools of this science. Allows students to explore such topics as artificial intelligence, graphics, and database design by manipulating small, controlled "worlds" that model scientific, social, or business phenomena. Examines tools such as word processing, database management systems, spreadsheets, graphics, statistics, and a simple programming environment. Discusses relevant theoretical, historical, social, cultural, and ethical issues.

COM 1107 Introduction to Programming for Non-Computer Science Majors 1 4 QH

Introduces the Pascal language and the writing of computer programs. Examines variables, assignment, screen input-output, flow control (decisions and loops). Explores program design and problem solving using procedures and functions.

COM 1108 Introduction to Programming for Non-Computer Science Majors 2 4 QH

Examines simple data structures (arrays and strings), user-defined data structures, records, combinations of arrays and records, text file input-output, and simple graphics. Introduces recursion. Emphasizes examples that focus on problem solving and applying programming to other disciplines. *Prereq.* COM 1107.

COM 1110 FORTRAN Laboratory 1 QH

Considers elements of FORTRAN programming for those familiar with a high-level language such as Pascal or C. Includes input/output, subroutine linkage, and methods of structured programming in FORTRAN. *Prereq.* COM 1100.

COM 1114 C Laboratory 1 QH

Examines elements of C programming for those familiar with a high-level language such as Pascal and with elementary data structures. Emphasizes how C combines tools for structured programming with mechanisms for producing efficient code. Introduces UNIX. *Prereq.* COM 1101.

COM 1121 Computer Science Overview 1 1 QH**COM 1122 Computer Science Overview 2 1 QH**

Reviews and gives practice to the intellectual skills needed for success as a computer science major. Discusses issues that can affect academic success and introduces the intellectual and cultural opportunities at Northeastern University and in Boston.

Includes readings about major figures in computing and guest lectures that survey advanced fields in computer science. Looks ahead to professional work in computer science. *Prereq.* Computer science major.

COM 1130 Computer Organization and Programming 1 4 QH

Introduces computer organization and programming at the assembly-language level. Topics include arithmetic instructions, memory organization and data representation, addressing modes, flow control instructions, subroutines, procedures and linkage with higher-level languages, run-time stack structure, implementation of recursion, floating point and bit instructions, terminal I/O using system services or higher-level languages, and use of the debugger. *Prereq.* COM 1101.

COM 1131 Computer Organization and Programming 2 4 QH

Focuses on user-defined macros, character string instructions, decimal instructions and conversion, queue instructions, exception handlers, digital circuits, gate minimization, and combinational systems. *Prereq.* COM 1130.

COM 1201 Algorithms and Data Structures 2 4 QH

Introduces complex data structures and the corresponding algorithms for manipulation. Examines trees; binary search; priority queues, heaps, and heapsort; and quicksort. Introduces analysis of algorithms. Surveys graphs; depth-first and breadth-first search; shortest path and minimal spanning tree; sets, union, and find; hashing; and balanced trees. *Prereq.* COM 1101 and MTH 1137.

COM 1205 Software Design and Development 4 QH

Presents the latest ideas and techniques in software methodology and provides a means for students to apply these techniques. Students, working in groups, will be expected to design, implement, test, and document a large software project. *Prereq.* COM 1201.

COM 1310 File Structures 4 QH

Examines access characteristics of secondary storage devices (tapes, disks and drums); external sorting and merging for heap files; and algorithms for common file operations on heap, hashed, ISAM, B-tree, dense indexes and TRIE file structures. Covers overflow techniques; comparison of operations by block access count; and files with variable length records. Other topics include data compression techniques; structures for secondary access (multilist and inverted files); and retrieval for partially specified records and ranges of records. *Prereq.* COM 1130 and COM 1201.

COM 1315 Database Management 1 4 QH

Emphasizes the concepts and structures necessary to design and implement a database application and surveys some existing systems. Introduces database concepts and database modeling and entity relationship diagrams. Reviews physical data organization; the relational model, QUEL, and ISBL; design of a relational model and normal forms; and data definition and data manipulation languages for network

and hierarchical models. Compares models, some languages, and implementations for these models. *Prereq.* COM 1310.

COM 1316 Database Management 2 **4 QH**

Focuses on database systems that support relational model applications. Topics include recovery, query optimization, integrity, and security and concurrency, with examples based on INGRES and System R. Covers additional topics such as database machines at the discretion of the instructor. Implements a small relational DBMS. *Prereq.* COM 1315.

COM 1330 Systems Programming **4 QH**

Studies the structure and function of operating systems and their components. Emphasizes the fundamental issues in operating-system design: concurrency, deadlock handling, CPU scheduling, memory management, virtual memory, and I/O management. Allows students to program several resource management algorithms and evaluate them using simulation. *Prereq.* COM 1114 and COM 1131 or knowledge of the C language.

COM 1335 Operating Systems 1 **4 QH**

Presents an in-depth study of the algorithms and problems encountered in operating-system design. Investigates asynchronous concurrent processes, scheduling, resource management, design of the I/O subsystem, and system initialization. Illustrates issues that arise in design decisions through a detailed study of a small UNIX-like operating system. *Prereq.* COM 1330.

COM 1336 Operating Systems 2 **4 QH**

Explores advanced topics in operating system design. Allows students to complete the study of device management begun in COM 1335 and implement a device driver for a small operating system. Covers topics in theoretical aspects of operating system design such as mechanisms for high- and low-level synchronization, deadlock, distributed algorithms, management of paged memory, queueing theory, and computer security. *Prereq.* COM 1335 and MTH 1387.

COM 1350 Automata and Formal Languages **4 QH**

Topics include finite-state machines and regular expressions; context-free grammars; properties and decidability problems of regular and context-free languages; pushdown automata; pumping theorems for regular and context-free languages; and Turing machines, Church's thesis, and the halting problem. *Prereq.* COM 1201 and MTH 1137.

COM 1355 Compiler Design 1 **4 QH**

Implements concepts such as finite state automata, regular expression pattern matching, and context-free grammars using a lexical analyzer and a compiler-compiler. Emphasizes LALR(1) or LL(1) parsing with exposure to top-down, bottom-up, and operator-precedence methods. Examines ambiguous grammars and may include some code generation. Uses a "hands-on" approach, including either a sequence of programming assignments or a project. *Prereq.* COM 1131 and COM 1350.

COM 1356 Compiler Design 2 **4 QH**

Discusses advanced topics related to code generation: run-time environment, symbol table organization, and scope rules. Other topics include type checking, aggregate types (arrays and records), error analysis and recovery, code optimization, tail recursion, functional programming, and polymorphic functions. Implements theoretical ideas through programs or a large project. *Prereq.* COM 1355.

COM 1358 Analysis of Programming Languages **4 QH**

Topics include run-time behavior of programming languages; interpreters; static and dynamic scoping; parameter-passing mechanism; implementation of functions and recursion; and features of current languages and their implementation. *Prereq.* COM 1102.

COM 1370 Computer Graphics **4 QH**

Focuses on characteristics and programming of graphics output devices. Presents basics point and line drawing, two-dimensional displays, and clipping and windowing. Surveys pictures: data structures and display file organization; and interaction: graphical input and external events-operating system considerations. Includes some three-dimensional drawing. *Prereq.* COM 1201 and MTH 1301.

COM 1390 Analysis of Algorithms **4 QH**

Introduces the basic principles and techniques of analyzing algorithms. Topics include algorithms on sorting, searching, graphs, and digraphs (such as minimal spanning tree, shortest path, depth-first search, components of a graph); and methods involving string matching, polynomials and matrices. Considers fast Fourier transform and the concept of N P-complete problems. *Prereq.* COM 1201, MTH 1125, MTH 1137, and MTH 1301.

COM 1410 Artificial Intelligence **4 QH**

Focuses on analysis of current computer algorithms dealing with problems such as theorem proving, chess playing, general problem solvers, robotics, symbolic computation, perceptions, and self-reproducing automated parallel machines. *Prereq.* COM 1102, COM 1201, and MTH 1409.

COM 1420 Principles and Methods in Interactive Systems Design **4 QH**

Introduces principles of computer-human interface (software) design, and methodologies of implementation, evaluation, and research in computer-human interaction. Topics include user psychology, dialog styles (menu interfaces, command languages, icons, windows), screen layout and design, input and output devices (mouse, touchscreen, keyboard, voice technology), error handling/reporting and system response time, user documentation, and "intelligent" interfaces. Traces techniques for implementing software-human interfaces, and methodologies for testing and assessing the "usability" of interactive systems.

COM 1600 Computer Science Project **4 QH**

Presents the latest ideas and techniques in software methodology and provides a means for students to apply these techniques. Students, working in groups,

will be expected to design, implement, test, and document a large software project. *Prereq.* COM 1102, COM 1110, COM 1201, and COM 1355.

COM 1621 Computer Science Seminar 1 QH

A capstone course for computer science majors. Meetings are held once or twice per week and a current topic or problem in computer science is presented by an expert in the subject matter. Students are assigned additional questions and/or problems to research in the topic area as an aid to developing a deeper appreciation and understanding of various aspects of computer science. *Prereq.* Computer science seniors only.

COM 1700, COM 1701, COM 1702, COM 1720, COM 1730, and COM 1731 4 QH each

Offers a special section for honors students in COM 1100, COM 1101, COM 1102, COM 1201, COM 1130, and COM 1131 respectively. *Prereq.* Enrollment in the Honors Program or permission of the instructor.

COM 1705, COM 1717, COM 1737, and COM 1757 5 QH each

Offers a special section for honors students in COM 1205, COM 1316, COM 1335, and COM 1350 respectively. *Prereq.* Enrollment in the Honors Program or permission of the instructor.

COM 1770 Honors Computer Science Seminar 4 QH

Offers a capstone course for computer science honors students. Exposes students to a variety of com-

puter science topics of current interest, and provides an opportunity to improve skills in presenting technical material. Requires students to prepare a one hour presentation of professional quality on a topic of interest in computer science. Requires the student to write paper on the same topic.

COM 1777 Honors Adjunct Computer Science 1 QH

Allows honors students who do not have an honors section to do honors work in one of the computer science elective courses while enrolled in the regular course.

COM 1800 Directed Study in Computer Science 4 QH

Programs of directed study, held one or more quarters, are available for highly motivated students who wish to explore in depth special topics in computer science. Directed study can be used as an opportunity to examine familiar material in fresh ways or to explore new material that is not offered in formal courses. Provides students strong in computer science and related sciences a chance to develop the art and skill needed to work independently and creatively in computer science. *Prereq.* Permission of the instructor; may be repeated for credit.

COM 1810 Topics in Computer Science 4 QH

Focuses on an advanced topic in computer science to be selected by the instructor. *Prereq.* Permission of the instructor.

Engineering Technology

Chemical Engineering Technology

CHT 1381 Nuclear Technology 4 QH

Discusses atomic and nuclear structure, discovery and nature of radioactivity-clear reactions and energy-induced nuclear transformations, neutron properties, and applications of radio nuclides. Analyzes radiological safety nuclear instrumentation for particle detection, monitoring, and experimentation. Topics include the fission process and application; the classification, design, and application of nuclear reactors; nuclear fuel processing; and radioactive waste disposal. Includes supplementary lab experiments. *Prereq.* MTH 1195 and PHY 1196.

Computer Technology

CT 1105 Introduction to Programming 4 QH

Introduces Pascal as a solution to problems of using the computer. Topics include problem-solving, flow-charting, structured programs, loops, counters, and procedures. Utilizes the University's computer facilities to run program assignments. *Prereq.* None.

CT 1150 Computer Organization 4 QH

Introduces basic computer components. Discusses the function and basic operation of CPUs, main memory, and secondary memory and examines the functions of an operating system and its relationship with a program. *Prereq.* CT 1105 or CT 4105.

CT 1310 FORTRAN 4 QH

Presents FORTRAN 77 as a second language with emphasis on structured programming and modularity. Topics include lists, matrices, subroutines, functions, character-data manipulation, file processing, and documentation. Utilizes the University's computer facilities to run program assignments. *Prereq.* CT 1105 or CT 4105.

CT 1311 Programming with C Language 4 QH

Emphasizes writing programs in C, a general purpose programming language useable for operating systems or numerical, text-processing, and database programs. Assumes a basic knowledge of programming fundamentals. Topics include basic data types, operators and expressions, control flow (if/else, while, and others), functions and program structure, external variables, scope rules, pointers, address arithmetic, structure and union, and the C I/O library. *Prereq.* CT 1310 or CT 4310.

CT 1330 Data Structures 4 QH

Examines data, structures, storage, and manipulation and retrieval methods. Includes writing and running data manipulation programs using Northeastern's computer. Topics include stacks, queues, lists, trees, heaps, sets, graphs, searching,

sorting, key processing, and relational models. *Prereq.* CT 1311 or CT 4311.

CT 1333 UNIX Operating System 4 QH

Surveys advanced topics relevant to the UNIX operating and filing systems. Covers the differences between the AT&T and Berkeley versions of UNIX. Other topics include pipes, forks, excel, filter, signals, concurrency, processes, semaphores, EMACS, C pre-processor, macros, sed, grep, awd, make, gdb, dbx, lint, cb, lex, yacc, TeX, and shell programming. *Prereq.* CT 1330.

CT 1334 Object Oriented Programming 4 QH

Surveys the methodologies currently being used in object oriented programming languages. Reinforces concepts with case studies of Small Talk, Flavors, CLOS, and C++. Examines G-Base, an object oriented database system, and introduces the concepts of abstraction, polymorphism, class inheritance, locks, and generic dispatch. *Prereq.* CT 1330.

CT 1335 Numerical Algorithms 4 QH

Studies computer methods for solving mathematical problems. Involves writing and running application programs using Northeastern's computer. Topics include deterministic versus stochastic methods, random-number generators, iterative versus noniterative solutions, maxima and minima in two and three variables, curve fitting in two and three variables, integrals, trapezoidal and Simpson's rules, slopes, difference equations in two and three variables, vector and matrix algebra, simultaneous linear equations, nonlinear equations, permutations, and combinations. *Prereq.* CT 1310.

CT 1340 Software Engineering Design 4 QH

Offers structured methods for developing complex computer software. Provides students the opportunity to develop structured specifications, structured designs, and computer programs for complex problems and to test those programs using the University's computers. Topics include partitioning, hierarchical organization, data flow diagrams, data dictionaries, structured English, decision trees, decision tables, structured charts, team design, structured programs, and maintainability. *Prereq.* CT 1311 or CT 4311.

CT 1345 Assembly Language 4 QH

Studies a typical microprocessor assembly language. Includes writing and running homework problems on microprocessor-based systems. Topics include CPU and binary system programming model, instruction sets, addressing modes, binary operations, code conversion, subroutines, macros, and I/O. *Prereq.* CT 1150 or CT 4105 and CT 4150.

CT 1348 LISP 4 QH

Introduces an interactive language in which the LISP interpreter is commonly referred to as the read-evaluate-print loop. Discusses LISP's various levels of implementation in detail. Explores LISP as an excellent medium for implementing standard techniques in data-structure manipulation, techniques for recur-

sion, complex data structures, storage management, and symbol-table manipulation. *Prereq.* CT 1330 or CT 4330.

CT 1351 Advanced Computer Organization 4 QH

Examines the functional characteristics of complex and special-purpose computer systems, the functions of a general-purpose multiuser, and a multiprocess operating system. Advanced topics include virtual memory and virtual machine architectures, distributed and multiprocessor systems, array processors, and system performance analysis. *Prereq.* CT 1356 and CT 1375 or CT 4356 and CT 4375.

CT 1355 Microprocessor Peripheral Hardware 4 QH

Considers the elements of microprocessor peripheral hardware and its interfacing. Covers designing and analyzing microprocessor systems, including detailed schematics, timing diagrams, and technical documentation. Topics include serial I/O devices, DMA and interrupt control devices, standard buses, bus arbitration techniques, and bus support VLSI. *Prereq.* CT 1374 or CT 4374.

CT 1356 Complex Peripheral Hardware 4 QH

Surveys the interfacing and implementation of complex peripheral systems including disc and tape interfaces, graphic display devices, communication interfaces and subsystems, and I/O processors. *Prereq.* CT 1355 or CT 4355.

CT 1360 Industry Software 4 QH

Surveys current commercial software packages and methods. Utilizes commercial packages implemented on Northeastern's computer where applicable. Topics include specific packages and methods including database management, scientific and statistical analysis, security and privacy, software assurance, and documentation. *Prereq.* CT 1330 and CT 1340 or CT 4330 and CT 4340.

CT 1363 Concurrent Programming 4 QH

Examines the principles of concurrent programming. Involves writing and running programs to demonstrate aspects of concurrent programming techniques and issues. Explores correctness of concurrent programs, material exclusion, the timing of Dekker's algorithms, the producer-consumer problem, monitors, semaphores, "Ada Rendezvous," critical regions, and conditional variables. *Prereq.* CT 1330 and CT 1340 or CT 4330 and CT 4340.

CT 1365 Industry Hardware 4 QH

Discusses the latest industrial developments and trends in computer hardware. Conducted as a seminar. *Prereq.* CT 1356.

CT 1368 Semiconductor Logic 4 QH

Analyzes the bipolar and MOS transistors in saturated and cutoff condition and implements these concepts to form basic logic and decision-making circuits. Demonstrates converting logical expressions into hardware configuration representations. Focuses on Ebers-Moll modeling, PMOS, NMOS, CMOS construction, and logic families. *Prereq.* EET 1311 or EET 4311.

CT 1369 Computer Logic**4 QH**

Introduces the hardware building block of digital computers. Presents configurations of gates and memory components to achieve combinational and sequential composite logical functions. Discusses finite state machine design and analysis, gates, flip-flops, registers, decoders, ALU's, memory arrays, and synchronous and asynchronous state machines. *Prereq. CT 1368 or CT 4368.*

CT 1374 Introduction to CPU Hardware**4 QH**

Introduces the circuits and operation of a micro-computer. Studies the microprocessor and its basic support components and circuits, including detailed timing and functional analysis of their interactions. Topics include central processing unit, memory, addressing, clocking, bus concepts, interrupts, co-processors, I/O, and instruction timing. *Prereq. CT 1345 or CT 4345 and CT 1368 or CT 4368.*

CT 1375 CPU Hardware Architecture**4 QH**

Reviews high performance microprocessor architecture and hardware interfacing techniques. Analyzes current commercial processors and their support components. Focuses on internal CPU architecture, memory management, instruction prefetch, privilege states, bus cycles, control line, I/O, interrupts, and exceptions and pipelining. *Prereq. CT 1374 or CT 4374.*

CT 1377 VLSI Design**4 QH**

Examines very large scale integration (VLSI) integrated circuits (ICs), the key components of all modern computers. Introduces MOS devices, circuits, design methods, and fabrication techniques used in producing custom VLSI ICs. Topics include MOS transistor characteristics, basic gate circuits, scaling, manual and automated layout tools, wafer-fabrication techniques, standards, testing, and costs. *Prereq. CT 1369 or CT 4369.*

CT 1379 Computer Networks**4 QH**

Introduces the functional and operational aspects of computer networks. Topics include the ISO Reference Model's seven layers, ARPANET, DECNET, and SNA. *Prereq. CT 1380 or CT 4380.*

CT 1380 Data Communication Methods**4 QH**

Introduces the ISO open systems interconnect model for communication system, and functional and operational aspects of data communication devices and software. Utilizes a black box approach. Examines modems, control units, multiplexers, concentrators, front end processors, and error checking. *Prereq. CT 1375 or CT 4375.*

CT 1381 Operating Systems**4 QH**

Surveys the basic principles and organization of operating system implementation. Explores processor management; process multiplexing and synchronization; schedules; atomic operations and mutual exclusion; sequential and concurrent programming; memory; and device and data management. *Prereq. CT 1150 and CT 1311 or CT 4350 and CT 4311.*

CT 1382 Computer Graphics Programming**4 QH**

Introduces generalized techniques for computer plotting of two- and three-dimensional shapes. Involves writing and running programs using the University's computer and digital plotter. Considers 2D and 3D transforms; 3D to 2D transforms; surface representation; shaping; hidden line; raster technology-color; introduction to interactive graphics characters; curve fitting; and graphic data structures. *Prereq. GET 1100 or CT 1310 or GET 4100 or CT 4310.*

CT 1383 Databases**4 QH**

Examines database organization structure and management. Utilizes the University's computer to write and run programs exemplifying techniques developed in class. Covers access methods, attributes, indices, keys, querying, searching and matching, file sets, inverted file sets, normal forms, and random access. *Prereq. CT 1330 or CT 4330.*

CT 1384 Large System Assembly Languages**4 QH**

Utilizes VAX-11 assembly language macro to show how basic components in the CPU are used during program execution. Emphasizes integer, real, and character instruction sets; various address techniques; procedure linkage; and main and system I/O. Utilizes the University's computer facilities to run program assignments. *Prereq. CT 1345 or CT 4345.*

CT 1385 Introduction to Simulation Programming**4 QH**

Focuses on computer methods for solving simulated phenomena. Involves writing and running programs implementing simulations specified by instructor. Explores simple queues; multiserver queues; priorities, including first in first out, last in last out, and time aging of data; simple frequency distributions; use of SIMULA, GPSS, and standard Subroutine Library Routines. *Prereq. CT 1335.*

CT 1386 Development System Hardware**4 QH**

Studies the principal hardware capabilities and current trends in microcomputer level system-Includes both single users and network-oriented system. *Prereq. CT 1375.*

CT 1387 Bit-Slice Microcomputers**4 QH**

The epitome of hardware flexibility is represented by the bit-slice CPU. Demonstrates the basic design ground rules common to this style of hardware design. *Prereq. CT 1355 or CT 4355.*

CT 1388 Micro Controllers**4 QH**

The commercial segment of microcomputers has been satisfied by a variety of single-chip 4-bit micro controllers. A detailed contrast/comparison will be done on several of these devices, including the IMS-1000, S2000, COPS, and PPS-4. *Prereq. CT 1374.*

CT 1389 Single-Chip Microprocessors**4 QH**

When small 8-bit intelligent devices are rewired in high volume, the single-chip microprocessor in the form of the 3870, 8084 Z8, and others comes into play. An understanding of the hardware limitations of a single-chip system presents the basis for this subject material. *Prereq. CT 1374 or CT 4374.*

CT 1390 Special Problems in Computer Technology 4 QH

Theoretical or experimental work under individual faculty supervision.

CT 1395 Computer Security 4 QH

Focuses on issues related to security in computing, including the history of security, encryption techniques and applications, secure communications, and software protection. Covers software verification and validation, security design in hardware, and products currently available for recurring systems and data. Discusses privacy as well as reliability. *Prereq.* CT 1380 or CT 4380.

CT 1396 PROLOG: An Introduction to Artificial Intelligence 4 QH

Introduces fundamental artificial intelligence (AI) terms and techniques using PROLOG as a programming language. Topics include knowledge representation, search, parsing, logic, and inference techniques. Uses student projects as an integral part of the course. *Prereq.* CT 1330 or CT 4330.

Electrical Engineering Technology**EET 1151 Circuit Analysis 1 4 QH**

Examines Ohm's law, Kirchhoff's current and voltage laws, equivalent resistances and sources, mesh and modal analysis, network theorems, two-port networks and power relations—all with respect to direct currents. Topics include energy storage, singularity functions, response of R, L, and C elements to singularities. *Prereq.* MTH 1193 and PHY 1193.

EET 1152 Circuit Analysis 2 4 QH

Studies complex algebra, phasors, frequency domain, mutual inductance, transformers, steady-state AC theory, driving point and transfer impedances. Topics include power and energy in AC circuits, Laplace transforms, partial fraction expansion, and Laplace transform techniques applied to the solution of RLC networks. *Prereq.* EET 1151.

EET 1310 Electrical Measurements 4 QH

Covers standards of measurements, dimensional analysis, errors and measurement of dispersed data, discrete and continuous variables, binomial distribution, and normal distribution. Topics include guaranteed error, methods of resistance measurements, digital voltmeters and analog-to-digital conversion, voltage references, and potentiometers and AC bridges. *Prereq.* EET 1353.

EET 1311 Electronics 1 4 QH

Discusses semiconductor diodes and applications, transistor-biasing techniques, graphical analysis of basic amplifiers, and DC and AC load lines. *Prereq.* EET 1152.

EET 1312 Electronics 2 4 QH

Investigates small-signal, low-frequency transistor models, gains and impedances at midband, frequency effects in transistor circuits, multistage circuits, and transistors used as current sources. *Prereq.* EET 1311.

EET 1313 Electronics 3 4 QH

Reviews of Bode plots, transistor circuits at low and high frequencies, feedback operational amplifiers, differential amplifiers, and applications. *Prereq.* EET 1312.

EET 1314 Pulse and Digital 1 4 QH

Covers switching characteristics of semiconductor devices, wave generation and shaping, and using combinations of passive and integrated circuit components. Studies comparators, hysteresis, dual ramp analog-to-digital converter-voltmeter circuits, and voltage-to-frequency conversion. *Prereq.* EET 1311.

EET 1315 Pulse and Digital 2 4 QH

Examines digital operations, logic statements and theorems, minimization of logic functions, logic gates and the characteristics of the integrated logic families, flip-flops, counters, and registers. Introduces sequential circuit design, sample and hold circuits, and analog-to-digital conversion. *Prereq.* EET 1314.

EET 1317 Principles of Communication Systems 1 4 QH

Focuses on signal analysis using Fourier methods, noise in communication systems, frequency selective amplifiers, including wideband, transistor power amplifiers AF and RF, oscillators, and signal sources and applications. *Prereq.* EET 1313.

EET 1318 Principles of Communication Systems 2 4 QH

Explores basic theory of amplitude, frequency, phase and pulse code modulated systems, analysis of modulating and demodulating circuits. Topics include carrier systems using SSB, system block and level diagrams, logic control circuits in communication systems, and modems. *Prereq.* EET 1317.

EET 1319 Principles of Communication Systems 3 4 QH

Emphasizes the fundamentals of digital communications, sampling requirements, analog-to-digital conversion methods, and system capacity and bandwidth. Topics include comparison of practical digital systems PAM, PCM, PFM, PWM, time and frequency division multiplexing, data decoding, and selected examples from telemetry and computer links. *Prereq.* EET 1318.

EET 1320 Electricity and Electronics 1 4 QH

Introduces circuit analysis, resistive networks, periodic excitation function, steady-state AC circuits, the physical foundations of electronics, and the physical operation of electronic devices. *Prereq.* MTH 1193 and PHY 1193.

EET 1321 Electricity and Electronics 2 4 QH

Examines single-stage electronic circuits, magnetic circuits and transformers, electro-mechanical energy conversion, DC machines, and AC machines. *Prereq.* EET 1320.

EET 1323 Electronic Laboratory 2 QH

Offers experiments demonstrating lab equipment (meters and oscilloscopes) techniques, junction and field-effect transistor characteristics, vacuum and semi-conductor diodes, power supplies, including the regulated type. Topics include silicon-controlled

rectifiers, and resistance-coupled amplifiers using transistors, including feedback methods. *Prereq. EET 1312 or concurrently.*

EET 1324 Circuits Laboratory 1 **2 QH**
Offers experimentation in electronic circuit theory utilizing various measurement techniques. Topics include instrumentation verification of circuit theorems, response of circuits to steps and impulses, and oscilloscope theory and applications. *Prereq. EET 1151.*

EET 1325 Circuits Laboratory 2 **2 QH**
Offers further experimentation in electrical circuits and measurement techniques. Experiments include response of circuits to steps and impulses, nonlinear devices, terminal characteristics of active devices, log modulus plots, network parameters and synthesis, and Fourier analysis and synthesis. *Prereq. EET 1324.*

EET 1327 Advanced Electronics Laboratory 1 **2 QH**
Offers experiments using oscilloscopes, the examination of transistor audio amplifiers, push-pull amplifiers, drivers, pulse and video amplifiers. Topics include transients and wave-shaping circuits, audio frequency oscillators, and the study of operational amplifiers. *Prereq. EET 1323.*

EET 1328 Advanced Electronics Laboratory 2 **2 QH**
Experiments with the modulation of a class C amplifier, the diode detector, basic timing circuits, RF and crystal oscillators, astable multivibrators, logic gates, flip-flops, binary adders, registers and counters. Topics include active filters, frequency modulation detectors, and analog-to-digital and digital-to-analog conversion. *Prereq. EET 1327.*

EET 1329 Advanced Electronics Laboratory 3 **2 QH**
Studies FM and PM waves, amplitude limiters, the balanced modulators and single sideband generators. Discusses integrated circuit timers and monolithic random access memory, and monolithic phase-locked loop, as well as a series of microwave experiments and digital experiments. *Prereq. EET 1328.*

EET 1330 Energy Conversion **4 QH**
Investigates generalized theory of rotating energy conversion devices, steady-state operation of the multiply-excited direct-current machine, control of speed, special machines, transformers, steady-state considerations of induction and synchronous machines. Explores the generalized machine and circuit model, and Laplace transform techniques applied to the analysis of dynamic operating modes of rotating machines. *Prereq. EET 1152 and MTH 1195.*

EET 1337 Distributed Systems **4 QH**
Examines radiation, transmission, and reception of electromagnetic waves, distributed-line constants and traveling waves of transmission lines, and differential equations of the uniform line. *Prereq. MTH 1195 and PHY 1193.*

EET 1353 Circuits Analysis 3 **4 QH**
Applications of differential equations to the solutions of linear, and time-invariant electrical networks. Introduces to singularity functions, convolution, and time-domain transient analysis, network topology and duality, and the methods of transformation calculus and complex frequency concepts. *Prereq. EET 1152.*

EET 1354 Circuits Analysis 4 **4 QH**
Focuses on signal analysis in the frequency domain, Fourier series, Fourier and Laplace transform methods, and a varied selection of circuit problems using Laplace transforms and related theorems. *Prereq. EET 1353.*

EET 1360 Engineering Analysis 1 **4 QH**
Studies linear algebra and circuit equation applications, as well as solution of linear differential equations, including an introduction to Laplace transforms. *Prereq. EET 1152 and MTH 1195.*

EET 1362 Basic Power Systems 1 **4 QH**
Focuses on power transmission lines, line constants, current voltage and power relations, electric-power distribution loads, feeders, and substations, and application of matrices. *Prereq. EET 1354.*

EET 1363 Basic Power Systems 2 **4 QH**
Investigates symmetrical and asymmetrical faults, protective devices—application and coordination, power flow in electric circuits, steady-state power limitations of systems, and voltage regulation theory and application. *Prereq. EET 1362.*

EET 1364 Basic Power Systems 3 **4 QH**
Offers computer applications to power systems with emphasis on load-flow studies, basic ideas of systems planning, short-circuit studies, and system stability. *Prereq. EET 1363.*

EET 1370 Digital Computers 1 **4 QH**
Introduces digital computer design. Topics include general computer organization, number systems and number representations, design characteristics of major computer units, and Boolean algebra applications to computer design. *Prereq. EET 1311.*

EET 1371 Digital Computers 2 **4 QH**
Examines microprocessor architecture and organization. Studies the machine language and assembly coding of an industry-accepted microprocessor, and a suitable topic from the current literature. Assembly language coding problems assigned. *Prereq. EET 1370.*

EET 1377 Control Engineering 1 **4 QH**
Analyzes linear servomechanisms under both transient and steady-state conditions, signal flow graphs, and Laplace transforms in the formulation of block diagrams and transfer function. *Prereq. EET 1354 and MTH 1195.*

EET 1378 Control Engineering 2 **4 QH**
Focuses on system stability, root locus techniques, and treatment of Nyquist criteria and Bode diagram methods for systems evaluation. *Prereq. EET 1377.*

EET 1390 Optical Instrumentation 4 QH

Focuses on telescopes, microscopes, and similar equipment, as optical system components. Includes magnification, aberrations, resolution criteria, photometry, compatibility of system components and optimization of systems, and the basic nonimaging systems used for analysis control and metrology. *Prereq.* MTH 1192 and PHY 1193.

EET 1399 Special Problems in Electrical Engineering Technology 4 QH

Offers theoretical or experimental work under individual faculty supervision. *Prereq.* Consent of department chair.

General Engineering Technology**GET 1100 Computer Programming for Engineering Technology 4 QH**

Introduces computers for problem solving using FORTRAN 77. Topics include flowcharts, DO loops, arrays, subroutines, functions, and character manipulations. Students use the University's computer facilities to run programs. *Prereq.* MTH 1191 or MTH 4107 or taken concurrently.

GET 1170 Engineering Graphics 1 4 QH

Introduces manual and computer engineering drawing using geometric constructions, charts, and graphs. Geometric construction includes descriptive geometry, orthographic projection, sections, and isometric drawing. *Prereq.* None.

GET 1171 Engineering Graphics 2 4 QH

Studies computer and manual drawing in layout and assembly graphics. Topics include manufacturing processes, fasteners, gears, welding, electric/electronic drawing, architectural/structural drawing, piping, and topography. Design project required. *Prereq.* GET 1170 or equiv.

GET 1172 Electrical Engineering Graphics 4 QH

Introduces electronic graphics, including symbols, schematics, block and logic diagrams, production and cable drawings, and military standards. Studies single- and double-sided printed circuit layout, integrated circuits, electromechanical designs, wiring, interconnection diagrams, and graphical data presentation. *Prereq.* GET 1170 or equiv.

GET 1356 Engineering Economy 4 QH

Presents fundamental accounting concepts and terminology, including assets, liability, net worth, and analyzing income statements and balance sheets. Discusses introductory steps in analyzing investment proposals, time value of money, and cash flows. Analyzes cash flows in terms of present worth, annual worth, rate of return, and benefit/cost ratio. Considers depreciation and tax effects on cash flows. *Prereq.* MTH 1191.

GET 1364 Kinematics 4 QH

Studies four-bar linkages, sliders, and others, using orthogonal components of vectors, instantaneous centers, equivalent linkages, effective cranks, and so on, emphasizing graphical solutions, including an

introduction to the computer to enhance these concepts. Analyzes reverted and epicyclic gear trains, cam displacement, velocity, and acceleration diagrams. *Prereq.* GET 1171, PHY 1191, or equiv.

Mechanical Engineering Technology**MET 1301 Mechanics A 4 QH**

Explores forces, moments, couples, statics of particles, and rigid bodies in two- and three-dimensions. Examines external and internal distributed forces, first moments and centroids, and structures such as trusses, frames, and machines. *Prereq.* MTH 1193; or MTH 4120; PHY 1191 or PHY 4117.

MET 1302 Mechanics B 4 QH

Emphasizes friction, second moments, virtual work, kinematics of particles, rectilinear and curvilinear motion of dynamic particles. Topics include force, mass and acceleration, and work and energy. *Prereq.* MET 1301 or MET 4301.

MET 1303 Mechanics C 4 QH

Studies impulse and momentum of particles. Topics include kinematics and dynamics of rigid bodies: force, mass, and acceleration; dynamics of rigid bodies: work and energy, and impulse and momentum; and introduction to mechanical vibration. *Prereq.* MET 1302 or MET 4302.

MET 1314 Stress Analysis A 4 QH

Investigates axially loaded members, stress and strain, allowable stresses, factor of safety, temperature effects, indeterminate members and thin-walled pressure vessels. Topics include centric loading of bolted and welded connection, shear and moment in beams, eccentrically loaded connections, and flexural and transverse shearing stresses in beams. *Prereq.* MET 1301 or MET 4301.

MET 1315 Stress Analysis B 4 QH

Discusses determinate and indeterminate beam deflections and reactions by numerical and graphical integration and area moment methods, theorem of three moments and torsional stresses and strains. Topics include power transmission, eccentric loads on struts, beams, riveted and welded joints, combined and principle stresses, Mohr's circle, and theories of failure. *Prereq.* MET 1314 or MET 4314.

MET 1319 Mechanics 4 QH

Examines kinematics of particles, especially rectilinear and curvilinear motion of dynamic particles. Considers force, mass, acceleration, work, and energy. Discusses impulse and momentum of particles, and kinematics and dynamics of rigid bodies: force, mass, and acceleration. Also examines the dynamics of rigid bodies: work and energy, and impulse and momentum. *Prereq.* MTH 1193 and PHY 1191.

MET 1330 Mechanical Design A 4 QH

Introduces mechanical design, the design process, design factors, creativity, optimization, human factors, and value engineering. Discusses and develops principles through simple design projects. Topics

include principles of design, properties and selection of materials; stress concentrations; strength under combined stresses; theories of failure; and impact, fluctuation, and repeated loads. *Prereq. MET 1315 or MET 4315; MET 1380 or MET 4380.*

MET 1331 Mechanical Design B

4 QH

Explores stresses, deformation and design of fasteners, screws, joints, springs, and bearings, lubrication, and journal bearings. Topics include stresses and power transmission of spur, bevel, and worm gear, shaft design, and clutches and brakes. *Prereq. MET 1330 or MET 4330.*

MET 1340 Thermodynamics A

4 QH

Introduces general theory of heat and matter, laws of thermodynamics, energy-transformation principles, availability of energy, properties and processes for pure substances and ideal gases. Topics include thermodynamic properties and processes of liquids and vapors, tables and charts, mixtures of fluids, and vapor cycles. *Prereq. PHY 1192 or PHY 4118.*

MET 1341 Thermodynamics B

4 QH

Discusses theory of vapor engines and analysis of actual engine types using gas and vapor compression, internal combustion engines, theory of gas and vapor flow through orifices and nozzles, and principles of gas compression. Includes analysis of vapor compression, refrigeration systems, low-temperature refrigeration cycles, and absorption refrigeration systems. *Prereq. MET 1340 or MET 4340.*

MET 1342 Refrigeration and Air-Conditioning

4 QH

Focuses on air-conditioning principles, including psychometrics and heat pumps. Examines calculation of heating and cooling loads in accordance with ASHRAE practices, principles of gas compression, analysis of vapor compression, refrigeration systems, low-temperature refrigeration cycles, and absorption refrigeration systems. *Prereq. MET 1341 or MET 4341.*

MET 1343 Heat Transfer

4 QH

Studies the primary modes of heat transfer, thermal conductivity, thermal conductance/resistance concept, thermal-electrical analogy, combined heat-transfer mechanisms, and basic equations of conduction. Investigates analytical solutions of various steady-state conduction problems. Also covers dimensional analysis and similarity considerations, natural and forced convection, hydrodynamic and thermal boundary layers, black-body radiation, Kirchhoff's law, emissivity and absorptivity, radiation between simple bodies, numerical methods, log mean temperature differences, and overall heat transfer coefficients. Topics include heat exchanger effectiveness, tubular exchanger design, regenerative and evaporative heat exchangers, and heat transfer engineering problems. *Prereq. MET 1341 or MET 4341.*

MET 1370 Fluid Mechanics A

4 QH

Investigates hydrostatics, principles governing fluids at rest, pressure measurement, hydrostatic forces on

submerged areas and objects, and simple dams. Topics include fluids in moving vessels, hoop tension fluid flow in pipes under pressure, fluid energy, power, and friction loss, Bernoulli's Theorem, and flow measurement. *Prereq. MET 1302 or MET 4302.*

MET 1371 Fluid Mechanics B

4 QH

Explores pipe networks and reservoir systems, flow in open channels, uniform flow, energy, friction loss, minor losses, and velocity distribution. Topics include alternate stages of flow, critical flow, non-uniform flow, accelerated and retarded flow, and hydraulic jump and waves. *Prereq. MET 1370 or MET 4370.*

MET 1380 Materials A

4 QH

Introduces fundamental metallic structures, general metallurgical information covering theoretical aspects of properties, testing, and failure of metals. Supplemented by visual aids. Topics include alloying and hardening of metals, refinement of metals, equilibrium diagrams, characteristics of engineering metals, and principles of metal fabrication.

MET 1390 Measurement and Analysis Laboratory

2 QH

Offers experiments for the collection and analysis of data by graphics and numerical methods including computer applications, report writing that draws conclusions relative to accuracy, precision, true values, and measured values as they relate to basic mechanical measuring instruments for length, area, volume, specific gravity, pressure, temperature, and time as these parameters are utilized in making mechanical measurements. *Prereq. GET 1100 or GET 4100; MET 1314 or MET 4314; MTH 1195 or MTH 4122; and PHY 1193 or PHY 4119.*

MET 1391 Technology Laboratory A

2 QH

Presents experiments to determine mechanical properties of materials under tensile, compressive, torsional, direct shear, flexural, impact, fatigue, and creep loading conditions as they are affected by normal and abnormal environmental conditions; also as they are affected by homogeneity, nonhomogeneity, isotropy, and nonisotropy. *Prereq. MET 1315 or MET 4315; MET 1380 or MET 4380; MET 1390 or MET 4390; or concurrently.*

MET 1392 Technology Laboratory B

2 QH

Offers experiments to determine the physical properties of incompressible fluids and to measure the flow rates and velocities utilizing pilot tubes, orifice plates, venturii and weirs flow meters, U-tube differential manometers, and piezometers as the fluid flows through open channels, partially filled conduits, conduits under pressure, pipe networks, turbines and pumps. *Prereq. MET 1390 or MET 4390; MET 1370 or MET 4370; or concurrently.*

MET 1393 Technology Laboratory C

2 QH

Explores basic thermodynamic relations. Experiments examine the flow of compressible fluids and steam and the energy conversion of a fuel into a working substance and the related heat-transfer mechanisms. Discusses operating characteristics of

thermal generators, engines, and compressors. *Prereq.* MET 1390 or MET 4390; MET 1341 or MET 4341; or concurrently.

MET 1394 Technology Laboratory D

2 QH

Presents experiments to examine the operating characteristics and efficiencies of internal combustion engines, brake horsepower, indicated horsepower, friction horsepower, and mean effective pressure. Topics include fuel consumption, torque, ignition timing, manifold pressure, and compression ratios and internal engines as energy conversion systems, and energy conversion of fuels. *Prereq.* MET 1341 or MET 4341; MET 1343 or MET 4343; MET 1393 or MET 4393; or concurrently.

MET 1395 Technology Laboratory E

2 QH

Offers experiment, analytical, and design projects to examine refrigeration, air conditioning, and heating pump cycles. *Prereq.* MET 1342 or MET 4342; MET 1343 or MET 4343; and MET 1390 or MET 4390.

MET 1396 Machine Shop

4 QH

Introduces the study of machines for metal processing, cutting tools, and fluids, machinability, and automatic machinery.

MET 1414 Mechanical Vibrations

4 QH

Examines elements of vibrating systems, one degree of freedom (undamped free and forced vibration from Newton's law of motion and energy methods), natural frequencies, and damped free and forced vibration. Topics include impedance and mobility, systems with more than one degree of freedom; influence coefficients, Lagrange's equations, generalized coordinates, and vibration absorber. *Prereq.* MET 1303 or MET 4303.

MET 1415 Experimental Stress Analysis

4 QH

Explores theory and experimentation showing the application of extensometers and electrical strain gauges as transducers in the field of experimental stress and strain analysis. Presents theory and lab practice on photoelastic methods as applied to classical model analysis and modern coating analysis. *Prereq.* MET 1315 or MET 4315.

MET 1416 Stress Analysis C

4 QH

Discusses curved beam, asymmetrical bending of beams, shear-center and shear stresses on thin sections, composite beams; columns energy absorption and resilience, inertial stresses, impact loading, and deflection of beams by energy methods. *Prereq.* MET 1315 or MET 4315.

MET 1444 Power Generation

4 QH

Examines basic power generation cycles; gas turbine cycles; effects of combustor temperature, intercooling, and such, on cycle performance; Rankine

regenerative cycles, effects of steam temperature, pressure, number of feedwater heaters, and so on, upon performance; steam generation equipment; boilers; reactors. Considers fossil fuel characteristics and effects on boiler design; combustion analysis; draft calculations, axial and centrifugal fan performance characteristics; pump design and performance consideration; heat-exchanger design considerations. Topics include applications of principles of economics to cycle and performance considerations use of load curves; economic considerations of heat rate; economics of equipment selection; and study of auxiliary equipment such as precipitators and flue-gas desulfurization systems. *Prereq.* MET 1341 or MET 4341.

MET 1481 Materials B

4 QH

Focuses on the study of inorganic materials (polymers, glasses, ceramics, cements, wood), and materials having important electrical and magnetic properties. A summary of the most recent applications for the fabrication and uses of both metals and nonmetals. Structures of metals, imperfections, phase diagrams effect of temperature on structure and properties of metals (annealing, recrystallization, recovery, precipitation, diffusion) strengthening mechanisms, mechanical properties of nonferrous metals. Lab experiments in preparation of samples, selection, polishing, and etching; examination of nonferrous metals, use of the microscope, linear analysis construction of cooling curves, and simple binary-phase diagrams. *Prereq.* MET 1380 or MET 4380.

MET 1482 Applied Metallurgy

4 QH

Investigates mechanical properties of ferrous metals; the iron-carbon diagram; high-temperature alloys, hardening methods, impact tests, and effects of environment on metals. Manufacturing processes: methods of fabrication, limitations on the use of different materials and their processing, casting, welding, cutting, drawing, and powder metallurgy. Lab experiments on analysis of stress-strain diagrams of iron and steel, heat treatment of steels, surface corrosion, tempering and drawing, and the use of metallograph and analysis of the results. Experiments in cold rolling, swagging, and drawing of nonferrous metals and analysis of the results. Tension, shear, fatigue, and machinability tests on ferrous metals. *Prereq.* MET 1481 or MET 4481.

MET 1499 Special Problems in Mechanical Engineering Technology

4 QH

Theoretical or experimental work under individual faculty supervision. *Prereq.* Consent of department chair.

African-American Studies

Please note some courses in the College of Arts and Sciences are duplicated in different departments or colleges, or within a department. You may not receive credit for two such courses. If you have a question about whether one course does overlap with another, please consult the departments involved and the Office of the Dean before taking the course.

Numbers in parentheses within course descriptions refer to core curriculum categories listed on page 2.

AFR 1100 Introduction to African-American Studies 4 QH

Explores several of the possible historical, sociological, cultural, and political avenues of study in the broad interdisciplinary spectrum of African-American studies. Provides an introductory overview of the field and will offer an opportunity to identify areas for more specific focus.

AFR 1115 Epidemiology of Black Diseases 4 QH

Introduces the science of epidemiology, the study of the occurrence of disease in populations. Explores the concepts, principles, and methods of epidemiological analysis, with emphasis on specific diseases occurring with greater frequency in urban and black populations, such as cardiovascular conditions, sickle cell disease, and certain occupational and environmental illnesses.

AFR 1127 African-American Literature 1 4 QH

Offers a survey of African-American literature from the period of slavery to the present, with an emphasis on literature concerning the relation between the rise of the black American and the development of African-American literature. The black experience as it is revealed in literature will be important in the discussion.

AFR 1131 African-American History 1 4 QH

Covers the development of black America from the period of slavery through Reconstruction, with emphasis on the historical links between Africa and America and the impact on black development in the United States. (III)

AFR 1132 African-American History 2 4 QH

Examines the development of black America from Reconstruction to the present, and the effects of events in the United States and world history on the development of black America. Emphasizes contemporary issues and how these issues can be seen through a historical perspective. *Prereq.* AFR 1131 or permission of instructor.

AFR 1133 History of Blacks in the Media and the Press 4 QH

Offers a historical and visual examination of the development of the African-American experience in the American mass media and press. Analyzes contemporary and historical literature, films, and people with respect to history, racism, images, psychology, and social movements. Newspapers, film, television, and radio are prime focal points, and are used to help form strategies for the future of black Americans.

AFR 1141 Education Issues and Minority Communities 1 4 QH

Focuses on some of the important issues in today's urban elementary and secondary education systems. The analysis will look at the historical development of these issues, and students will be encouraged to think about and discuss the issues' future significance.

AFR 1150 Black Cultural Development in the United States 4 QH

Focuses on the rise of a distinctive black culture in the United States, with emphasis on examining the premise that the black population in America has developed a cultural system that operates as a sub-system of the American cultural norm.

AFR 1151 Survey of African-American Art 4 QH

Black art, like black literature, has always been an important aesthetic social statement by the African-American artist. This course offers a historical and critical examination of African-American art from the nineteenth century to the present, with special emphasis on the effects of European and African art styles on the black artist in America.

AFR 1153 Survey of African-American Music 4 QH

Black music has evolved in fascinating ways over the past hundred years. Topics include the impact of African rhythm on black music, the New Orleans coalescence, regional development, ragtime, the emergence of large bands, the harmonic revolution of the forties, bebop, the 1960s avant-garde, and subsequent developments. Some analysis of specific jazz phenomena is included. This is the same as MUS 1104.

AFR 1156 Music of Africa 4 QH

The music of Africa is as varied as that continent's many linguistic and tribal identities. This course will provide a broad survey of the musical traditions of Africa with respect to their historical, social, and cultural backgrounds. Musical organization, musical practice, and aspects of style will all be discussed in light of possible contributions to contemporary African-American music. Same as MUS 1181.

AFR 1161 Economic Issues in Minority Communities 4 QH

Minority lifestyles, perspectives, self-images and social position in the urban community are all affected by economic factors, especially those specific to the minority poor. Students have the opportunity to examine these issues, particularly in terms of the application of basic economic theories to the economic realities of minority communities. (VI)

AFR 1171 Survey of Contemporary Black Political Movements 4 QH

The modern black political movements were inspired by a full-scale evolution of black political thought in America. Analysis of this evolution examines socio-political contests that have served as catalysts to these modern movements.

AFR 1191 Early African Civilization 4 QH

Studies the ancient empires of Africa, especially Ghana, Songhai, Mali, Zimbabwe, the city states of East Africa, and also the Congo Kingdom. Includes Ethiopian as well as Egyptian history and controversies to 1800.

AFR 1193 Africa Today 4 QH

With increasing numbers of nations striving for economic and political control in Africa, and with imperialist and colonial ideas remaining in the living memory of Africans, Africa presents a complex political and social picture to the rest of the world. This course examines some of the salient features of black art, politics, and identity in Africa.

AFR 1195 Identity and Nationalism in Africa 4 QH

How have centuries of imperialism, the struggle for national unity, and the continuing problems of racism and rivalry between factions affected the present identities and nationalist movements in Africa? This course explores problems peculiar to Africa and to any group of nations struggling against colonial ideas. Tribalism and the effects of European colonial partition on African identity are discussed.

AFR 1196 The Black Experience in the Caribbean 4 QH

Offers a descriptive and interpretive analysis of the growth of the modern black community in the Caribbean. Although the focus will be on the contemporary period, the course will examine that period in the context of colonialism and slavery in the Americas. Important racial, social, political, economic, and religious issues will be addressed.

AFR 1197 Modern African Civilization 4 QH

Explores African history and culture from 1800 to the present era. Emphasis will be placed on the relationship between Europe and Africa, the circumstances surrounding the imperialist partition of Africa, and the decolonization process. This course is the same as HST 1621. (IV)

AFR 1211 African-Americans in Science, Technology, and Medicine 4 QH

Studies the contributions that African-Americans have made to the development of science and technology in America. It examines the cultural and social factors that have encouraged blacks to work in the fields of science (biology, chemistry, physics) and technology (engineering and medicine). Certification of blacks within the American scientific community and the availability of science to the past and contemporary African-American communities are also explored. Readings, discussions, individual research topics, and interviews with black scientists, inventors/engineers, and doctors are used to develop the basic course material.

AFR 1214 Poverty and Health Care 4 QH

Why do the poor fail to get good health care? The course discusses problems of the poor and will examine the entire health care system, including Blue Cross and Blue Shield, Medicare and Medicaid, National Health Insurance, low-income barriers to health care, and future directions of medical care.

AFR 1220 The Black Novel 4 QH

The black novelist belongs to a unique literary group in the history of American fiction. Special attention is given to Chesnutt, Toomer, Wright, Ellison, and contemporary novelists, and to their different perceptions of the black experience in America.

AFR 1223 Black Poetry 4 QH

Black poetry has been an important describer of the black experience in American thought through three centuries. This course will survey the black American poet from colonial times to the present. Special attention will be given to major poets and the influences that shaped their works.

AFR 1235 Black History of Boston 4 QH

Examines the social, economic, political, and educational history of Boston's black community in the nineteenth and twentieth centuries. The development of the black community and its institutions is a major focus, and students are encouraged to study the past in an attempt to understand the present and interpret the future. Research data include participant observation, oral history, interviews, and primary and secondary source materials.

AFR 1240 Contemporary Issues in Black Society 4 QH

Introduces the various issues and problems that confront black Americans, including some of the realities of the social, political, and economic problems of contemporary black experience. Students are asked to assess the validity of specific social theories in relation to the black experience.

AFR 1241 The Black Family 4 QH

How does the black family function, both interpersonally and as a social unit? Anthropological and sociological theories deal with variations in family structure and the function of the black family in black society. The effects of slavery and colonization on the black family structure and functions are also explored. A side issue is a discussion of some of the differences and similarities between African, African-American, and African-Caribbean families.

AFR 1248 Race Relations in America 4 QH

Examines the interrelations of ethnic, cultural, and minority groups in the United States. Focus is on the nature of racial conflicts, discrimination, reverse discrimination, personal and institutional racism, and racial and ethnic stereotyping. Discussion considers avenues of improvement in attitude awareness and change.

AFR 1251 Survey of Black Theater and Drama 4 QH

Theater in America has been an important reflector of the national experience, and black theater, especially in recent years, has served the same purpose for the black community. The course focuses on the

development of black drama during the nineteenth and twentieth centuries, with emphasis on modern developments and their political and cultural significance.

AFR 1261 The Economics of Urban Poverty 4 QH

Like most Americans and people from around the world, blacks migrated to central cities in America to better their economic conditions. However, unlike other migrants to urban centers, they were not assimilated into the social/economic mainstream, and there is evidence of flagrant job, housing, and educational discrimination against them even during periods of affluence. During recession or depression, their problems were compounded. Students have the opportunity to survey the above events from an economic framework.

AFR 1274 Black Political Behavior 4 QH

Examines the social and psychological dynamics of black political participation. Main issues of the course include identity and political socialization and their impact on black voter turnout and partisan choices.

AFR 1280 Black Psychological Identity 4 QH

So much is said of stereotyping in news, on television programs, and in literature. The shaping of the black identity over three centuries in America is a complicated and perhaps even elusive problem. This course will look at the impact of slavery, racism, war, and poverty on the evolution of the black identity in America.

AFR 1294 Third World Political Relations 4 QH

Offers a comparative regional analysis of the political systems of third world nations of Africa, Asia, Latin America, and the Caribbean. Emphasis is on development strategies; problems of development, including national identity, political socialization and participation, national defense, and urbanization; and the positions of third world nations in the international community.

AFR 1297 Caribbean History 4 QH

Analyzes the development of the Caribbean from slavery to the present. The focus will be on the period 1918–1962 especially, and emphasis will be on the historical analysis of the relationship of the Caribbean with the United States and black Americans.

AFR 1300–AFR 1311 Directed Study 4 QH

Directed study offers the ambitious student the opportunity to pursue a special intellectual interest not covered by the department course offerings and to work on this interest with the department faculty member of his/her choice. The faculty member will closely supervise the project and act as adviser for the duration of the quarter.

AFR 1350 Research Seminar 4 QH

This course is divided into three parts, providing students the opportunity, first, to identify a substantive area of their concern (for example, welfare, political leadership, education) and to define a related problem in a research context; second, to be supervised

in designing a research methodology most appropriate for examining the problem area; and third, to conduct extensive research, test the hypothesis, and draw conclusions based on data analysis techniques.

AFR 1355 Directed Study for Senior Thesis 4 QH

The senior thesis is required of all African-American Studies majors; it offers students the opportunity to prepare a professional research paper under the close supervision of a scholar interested in students' particular research areas. *Prereq.* *Permission of instructor.*

AFR 1360 Field Research Seminar 4 QH

Seniors have the opportunity to work with a faculty member on an individual basis, while carrying out a particular research project off-campus. Students are required to refine and polish a topic and outline for the senior thesis. *Prereq.* *Permission of instructor.*

AFR 1380 Junior/Senior Honors Program 4 QH

For details contact the Honors Office, 183 Holmes.

AFR 1401 History of East Africa 4 QH

The first section of the course deals with the pre-colonial period and the problems of the partition of Africa. The second section focuses on the classical colonial period and the transformations of colonial policy after World War II, with particular emphasis on the ambiguity of decolonization and those features of the colonial system that seem to have become a part of the East African social and political environment.

AFR 1403 History of West Africa 4 QH

The history of West Africa has included the struggle for internal unity, economic development, and social justice. The Pan-Africanist ideology, W.E.B. DuBois's writings, African socialism, and the consolidation of power and leadership are some of the topical objectives in this study of African liberation, particularly the rise of West Africa.

AFR 1405 History of South Africa 4 QH

Initial attention is directed toward pre-colonial South Africa and the conflict between Africans and the Dutch and English settlers. The course then focuses on the formation and transformation of colonial policy after World War II, with particular emphasis on racism, neo-colonialism, liberation movements, and international involvement in the apartheid system. (VI) *Prereq.* *AFR 1491 or permission of instructor.*

AFR 1421 African-American Literature 2 4 QH

Continues AFR 1127. Focuses on principal writers and their major themes. *Prereq.* *AFR 1127 or permission of instructor.*

AFR 1431 Analysis of the Slavery System in America 4 QH

Attempts a comprehensive survey of the realities of the slavery system in America, with focus on the impact of slavery on blacks as well as on the society that perpetrated the system. Examination of slave narratives and other historical documents will provide insights into the origin of the slavery system and the way it functioned until the Emancipation Proclamation.

AFR 1432 Analysis of Comparative Slavery 4 QH

Slavery has had major psychological effects on the shaping of the black American experience, as well as on the experience of blacks throughout the world. An analysis of the sociological implications of slavery on group interrelations, social norms, and cultural aberrations covers several national versions of the slave system in Africa, Europe, the Caribbean, and North and South America.

AFR 1440 Racial Integration and Its Impact on Education 4 QH

This course offers an examination of the historical struggle for desegregation. This course analyzes current urban issues in racial integration and some of the projected effects of integration.

AFR 1446 The Black Elderly in America 4 QH

Surveys the demographic characteristics of black elderly Americans compared with those characteristics of white elderly. These statistics include age, sex, educational levels, income levels, occupations, sources of income, as well as the study and comparison of certain social characteristics of black and white elderly. These will include the use of their time, relationships with primary and extended family groups, and their own view of the history of their lives as black people in America. They will also give students a perspective of what they envision the future of blacks will be in the social and economic life of America. Students will be expected to devise a questionnaire, interview senior citizens, and write a paper based on this information.

AFR 1448 Religion in Black American Society 4 QH

Black life in America cannot be fully understood without a sense of the importance of religion in the community. This course looks at the impact of religion on social structures, group behaviors, moral codes, and belief patterns in black society. Topics include the church as a social organizer, the role of the black minister in the community, and the variety of black denominations in urban and rural areas.

AFR 1449 Junior/Senior Honors Program 4 QH

For details contact the Honors Office, 183 Holmes.

AFR 1451 Seminar: Creative Expression in Blues and Jazz 4 QH

Blues and jazz have been among the most far-reaching and original artistic expressions of blacks in America. The course touches on possible African sources of inspiration for the musical literature of blues and jazz; a more important focus, however, is on blues and jazz as a reflection of African-American life and on the impact these musical forms have had on black self-image and position in American culture.

AFR 1470 Black Political Thought 4 QH

How do the black people as a unit view the American political system and black people's chances of improving their lot in this country? This course examines black opinions, from the radical to the ultra-conservative, of the United States political system. The focus is historical in context and will address notions of political socialization and the development of black political ideologies.

AFR 1471 Seminar: Black Political Leadership 4 QH

Focuses on several prominent black political leaders in the twentieth century, with an examination of the factors and social contexts that contributed to or thwarted their leadership. Students will be expected to conduct research on a particular black political leader and present a critical analysis of the impact of that political leader on the black community. *Prereq.* AFR 1171 or consent of instructor.

AFR 1475 Public Policy Analysis 4 QH

Analyzes the dynamics of the public policy formation process at the local, national, and international levels, with particular attention to the implications of public policy for minority groups. Emphasis is placed on a critique of the policy maker's role and power in the socio-economic setting.

AFR 1480 Black Man/Black Woman 4 QH

Sociological and anthropological methods are used to examine black male and female personality development as well as the development of black male and female behavior, self-image, sexual roles, and behavior within both the black and the white communities.

AFR 1491 African Civilization 2 4 QH

This course on African civilization covers the period from 1800 to the present era. Emphasis will be placed on the relation between Europe and Africa, the circumstances surrounding the imperialist partition of Africa, and the decolonization process. *Prereq.* AFR 1191 or permission of instructor.

INT 1201 An Analysis of American Racism 4 QH

This seminar in contemporary aspects of racism in America discusses the cycle by which racism in our institutions helps form our attitudes and the manner in which our attitudes, in turn, shape our institutions. Emphasis is on the practical, day-to-day aspects of racism, rather than the theoretical and historical.

The following courses may be of interest to the student wishing to concentrate in African-American Studies. Descriptions for these courses may be found in the appropriate department listing.

PHL 1100 Introduction to Philosophy**PHL 1140 Social and Political Philosophy****PHL 1243 Existentialism****PHL 1335 Moral Philosophy****PHL 1303 Political Behavior****POL 1317 Law and Society****POL 1320 Political Parties and Pressure Groups****POL 1342 Crisis and Conflict in Black Africa****POL 1354 The Politics and Policies of Developing Nations****POL 1360 The Politics of Revolution and Change****POL 1362 Civil Liberties****POL 1370 Political Theory****POL 1378 Contemporary Political Thought****POL 1386 International Law****POL 1345 Urban Anthropology**

SOA 1355 Political Anthropology

SOA 1360 Economic Anthropology

SOA 1147 Urban Society

SOC 1170 Race and Ethnic Relations

SOC 1310 Class, Power, and Social Change

American Sign Language

Please note that some courses in the College of Arts and Sciences are duplicated in different departments or colleges, or within a department. You may not receive credit for two such courses. If you have a question about whether one course overlaps another, please consult the respective departments and the Office of the Dean before taking the course.

American Sign Language courses are an integral part of two undergraduate degree programs: the human services specialization in deaf studies and the linguistics major. For more information, contact the American Sign Language Program, 276 Holmes Hall. See also human services and linguistics majors.

ASL courses do not satisfy the College of Arts and Sciences modern foreign language requirement for the BA, but they do satisfy humanities requirements of many major programs. Many students take ASL courses as free electives for personal or professional enrichment.

ASL 1101 American Sign Language 1 4 QH
Introduces American Sign Language and deaf culture, focusing on frequently used signs, basic rules of grammar, nonmanual aspects of ASL, and some cultural features of the deaf community.

ASL 1102 American Sign Language 2 4 QH
Continues basic language and culture study. Offers an opportunity to build receptive and expressive sign vocabulary. Topics include use of the signing space; further use of nonmanual components, including facial expression and body postures. Introduction to fingerspelling. *Prereq.* ASL 1101 or permission of instructor.

ASL 1201 Intermediate American Sign Language 1 4 QH
Emphasizes further development of receptive and expressive skills, fingerspelling, vocabulary building, grammatical structures; encourages more creative use of expression, classifiers, body postures, and the signing space. Introduction to regional and ethnic sign variations and political and educational institutions of the deaf community. *Prereq.* ASL 1102 or permission of instructor.

ASL 1202 Intermediate American Sign Language 2 4 QH
Offers intensive practice involving expressive and receptive skills in story telling and dialogue. Introduces language forms used in ASL poetry and to the features of culture as they are displayed in art and the theatre. *Prereq.* ASL 1201 or permission of instructor.

ASL 1211 Deaf Culture 4 QH
Focuses on the status of deaf people as a linguistic and cultural minority group. Topics include the role of American Sign Language in the deaf community; educational and historical perspectives on deafness; and sociological and cultural make-up of the deaf community. *Prereq.* ASL 1101.

ASL 1212 Deaf History 4 QH
Surveys the history of deaf people in the Western world, with emphasis on the American deaf community, their language, education, and relationship to hearing society.

ASL 1301 Advanced American Sign Language Proficiency 4 QH
Emphasizes vocabulary building and mastery of fine points of grammar through rigorous receptive and expressive language activities. Includes student-led discussions, debates, and reports on topics in deaf culture, society, and current affairs. *Prereq.* ASL 1202 or permission of instructor.

ASL 1401 American Sign Language Literature 4 QH
Various genres of American Sign Language will be read and discussed in ASL. This course will concentrate on the work of current, recognized narrators in both literary and face to face storytelling traditions, and will also include selected autobiographical sketches, lectures, stories, and letters from the early 1900s by such historical figures as Clerc, Veditz, E.M. Gallaudet, and others. A videotaped research essay in ASL will be required at the end of the course. *Prereq.* ASL 1202.

ASL 1801, ASL 1802, ASL 1803, ASL 1804, ASL 1805 Directed Studies 4 QH each
Directed studies offer students an opportunity to go beyond course work of the regular curriculum or to pursue an individual learning project. May include research, practicum, or language development activity.

Art and Architecture

Please note some courses in the College of Arts and Sciences are duplicated in different departments or colleges, or within a department. You may not receive credit for two such courses. If you have a question about whether one course does overlap with another, please consult the departments involved and the Office of the Dean before taking the course.

Numbers in parentheses within course descriptions refer to core curriculum categories listed on page 2.

ART 1100 History of Art to 1400 4 QH
Provides a survey of Western art from prehistoric times to the Renaissance.

ART 1101 History of Art Since 1400 4 QH
Surveys Western art from the Renaissance to the twentieth century.

ART 1106 Introduction to Art 4 QH
Offers an introduction to the characteristics of the visual arts, including painting, sculpture, graphic arts, and architecture. Various examples of works of art are studied as an introduction to style and technique. Includes visits to museum collections and contemporary art galleries. (II)

ART 1111 Introduction to Architecture 4 QH
Introduces the history, theory, and practice of architecture. Shows how architects in different historical periods have balanced the demands of function, construction and aesthetics. Lectures concentrate on such specific designs problems as found in churches, houses, skyscrapers, and cities.

ART 1115 Art and Society 4 QH
Examines how societal forces and political ideologies are expressed in the visual arts, especially in painting and architecture. Combines a broad overview of a few significant historical periods with a more focused concentration on the past two hundred years.

ART 1124 Basic Drawing 4 QH
Focuses on basic drawing in pen and ink, pencil, charcoal, brush, and related media. Includes fundamentals of form, volume, and texture in drawing.

ART 1127 Basic Painting 4 QH
Presents an introductory studio course in the fundamental techniques of painting. Formal problems in the study of color, light, space systems, form, and composition establish the foundation for more individual creative expression. Critiques and slide lectures are used as needed.

ART 1130 Visual Studies Foundation 1 4 QH
Offers an introductory lecture/studio course clarifying basic principles, language, and concepts inherent in visual language systems. Utilizes both two- and three-dimensional media, including photography, film, video, and computer-generated imagery. Students will explore such fundamental concepts as composition, dimensional relationships, effects of color, pictorial and literal space, form, pattern, repetition, structure, figure/ground relationships, balance, and unity.

ART 1131 Visual Studies Foundation 2 4 QH
Continues ART 1130. Focuses on a more detailed, in-depth analysis of the special nature of the various visual art forms. Students will explore problems in painting, drawing, graphic design, sculpture, architectural design, photography, film, video, and computer generated imagery. *Prereq.* ART 1130 or equiv.

ART 1132 Principles of Graphics 4 QH
Examines principles of graphic forms through assigned problems, critiques, and lectures, emphasizing formal and conceptual understanding. Develops the student's visual problem-solving process, including comprehension of problem objective, working to specification, intensive investigation of alternatives, and the presentation of professionally crafted solutions.

ART 1134 Typography 4 QH
Introduces the fundamentals of typography, a key component of effective visual communication. Students will have the opportunity to become familiar with the historical roots, terminology, design styles, and production processes of typography. Studio problems will be assigned to explore the creative and expressive qualities of designing with type. *Prereq.* ART 1131.

ART 1138 Introduction to Printmaking 4 QH
Offers a hands-on course dealing with the methods and techniques of etching, drypoint, and calligraphy. Students will experiment with the processes of line etching, aquatint, soft/hard ground and paper relief prints as they develop an image. Slide presentations of prints will be shown each week.

ART 1139 Print Production 4 QH
Provides an overview of the production process for print graphics, including an introduction to offset lithography, screening, color techniques, composition, stat and process cameras, paper stocks, bindery methods, and economic factors. Emphasizes understanding how a design project is developed from concept to completion. Includes lectures, demonstrations, and studio problems. Lab fee.

ART 1150 Architectural Design 1 4 QH
Introduces fundamental design principles and their application to the built environment. Lectures, two- and three-dimensional design projects, and field trips. *Prereq.* ART 1156.

ART 1151 Architectural Design 2 4 QH
Continues ART 1150. Introduces the principles of climate, site, human factors, codes, building materials and systems, structure and economy. The creation of

three-dimensional small-scale environmental design projects offers experience in analyzing and synthesizing the elements of architecture by developing and evaluating design alternatives. Studies design processes and presentation techniques. Includes field trips, readings, lectures, and individual and group discussions. *Prereq.* ART 1150.

ART 1156 Architectural Drafting 4 QH

Introduces architectural drafting techniques, tools, materials, lettering, and dimensioning. Students will be expected to make orthographic, axiometric, one- and two-point perspective drawings.

ART 1160 Introduction to Photography 4 QH

Acquaints the beginning student with the use of the camera, the negative, and the print. Weekly shooting assignments, demonstrations, and hands-on lab experience are part of this active, primary-level course. Lab fee.

ART 1170 Filmmaking Workshop 4 QH

Introduces students to the nature and creative uses of video. Examines video's technological foundation, conventions, and aesthetic potential. Emphasizes weekly hands-on lab assignments and substantive final project. Includes lectures, screenings, and critiques. Facilities and equipment are provided by the department.

ART 1180 Video Basics 4 QH

Introduces the fundamental nature of the video medium and its creative use. Examines the technological foundation of video, the established conventions of effective field and studio production techniques and postproduction techniques (electronic editing), and explores the aesthetic potential of both the visual and auditory aspects of video. Emphasizes weekly hands-on lab assignments with a final substantive video project required of each student. Facilities and equipment are provided.

ART 1190 Introduction to Computer Graphics 4 QH

Introduces computer graphics, exploring the use of the computer as subject and tool for art making. Students will become acquainted through hands-on design projects, lectures, discussions, and demonstrations to the current and potential applications of computer graphics, and to the changing role of the artist in a technological society. Lab fee. *Prereq.* ART 1131 or equiv.

ART 1200 Ancient Architecture 4 QH

Surveys the architecture and urban form of Ancient Egypt, Mesopotamia, Greece and Rome, emphasizing the role Greece and Rome played in laying the foundation of Western architecture.

ART 1202 Armenian Art and Architecture 4 QH

Examines Armenia's castle and church architecture, sculpture, and illuminated manuscripts of the Middle Ages. Explores Armenia's ties with Rome, Byzantium, the Far East, and western Europe.

ART 1203 Medieval Architecture 4 QH

Studies the major religious and secular buildings of the Early Christian, Byzantine and Gothic periods, emphasizing Gothic architecture of France and England.

ART 1204 Renaissance Architecture 4 QH

Studies Italian painting and sculpture from the early fourteenth century to the end of the sixteenth century, with emphasis on the art of the great painters and sculptors of the Renaissance, such as Masaccio, Botticelli, Donatello, da Vinci, Michelangelo, and Titian.

ART 1205 Renaissance Art 4 QH

Surveys Italian painting and sculpture from the early fourteenth century to the end of the sixteenth century. Emphasizes the work of Masaccio, Botticelli, Donatello, da Vinci, Michelangelo, and Titian.

ART 1210 Nineteenth Century Painting 4 QH

Examines European painting and related arts including the neoclassical, romantic, realist, and impressionist movements. Emphasizes French painting, but also considers important developments in England and other western European countries.

ART 1213 Modern Art 4 QH

Traces the development of painting, sculpture, and related arts from European avant-garde in the late nineteenth century to the international market of the late twentieth century. Topics include challenges to traditional boundaries between media, the development of abstraction and the idea of pure form, and the recent emergence of a post-modern aesthetic.

ART 1217 History of Marine Painting 4 QH

Studies the image of the sea as used by various painters. Examines the work of such artists as Turner, Delacroix, Monet, Rembrandt, and many others stylistically within a historical context.

ART 1220 American Art 4 QH

Surveys the history of American painting and sculpture from the seventeenth century to the present. Focuses on the cultural forces that shape the evolution of art in America. Includes frequent museum visits.

ART 1223 American Architecture 4 QH

Introduces American architecture, town planning, and urban design from the 1700s to the 1930s. Considers European influences and uniquely American contributions.

ART 1225 Modern Architecture 1 4 QH

Surveys the development of modern architecture in England, France, Germany, and the United States from the mid-eighteenth to the late nineteenth century. Discusses architecture and urban design as a cultural response to society's changing conditions. Considers such themes as symbolism, morality, rationalism, and functionalism. *Prereq.* ART 1111 or permission of instructor.

ART 1228 Modern Architecture 2 4 QH

Examines the forms and principles of European and American architecture of the twentieth century, emphasizing the work of such key figures as Frank Lloyd Wright, Mies van der Rohe, Le Corbusier, and Louis Kahn; and such influential movements as the Dutch de Stijl, Russian constructivism, and American post-modernism.

ART 1230 History of Photography 4 QH

Explores photography from its origins in the early nineteenth century to its maturity in the mid-twentieth century. Surveys technological developments but emphasizes the emergence of photography as an expressive medium and its relation to other modern art forms.

ART 1233 Contemporary Directions in Photography 4 QH

A slide/lecture course designed to acquaint the student with trends in twentieth-century photography. Photojournalism, documentary, commercial, and creative photography will be examined closely in relation to other communication media.

ART 1235 History of Film 4 QH

Surveys major international developments in film from the late nineteenth century to the present. Examines national movements, technological and aesthetic innovations, important figures, and significant films. Includes films, lectures, and discussions.

ART 1236 American Film 4 QH

Surveys the rise of the American film from the late nineteenth century to the present. Examines key films, directors, major themes, and film forms and techniques. Includes lectures, screenings, and discussions.

ART 1237 Contemporary Directions in Cinema 4 QH

Contrasts major international film movements from World War II to the present. Examines key films, people, and themes in exploring the influences on contemporary film form and content.

ART 1238 Documentary Film 4 QH

Examines the aesthetics, tradition, and history of the documentary film, with major emphasis on contemporary directions.

ART 1240 History of Graphic Design 4 QH

Surveys graphic design from the mid-nineteenth century to the present. Focuses on the evolutionary development of graphic design, its special nature and function, major periods and trends, the historical influence of the fine arts, and contemporary directions in design evident today. Includes slide lectures and discussions.

ART 1241 Advertising Design 4 QH

Introduces conceptual and visual design problems commonly found in advertising. Students, through assigned studio projects, explore the use of layout, design, color, typography, image, the use of layout techniques and tools, and develop skills in design analysis and project development. Includes an overview of advertising design. Lab fee. *Prereq.* ART 1132 or *equiv.*

ART 1243 Graphic Design 2 4 QH

Reinforces the fundamental practices and principles of good design with a special emphasis on developing overall design concepts. Students explore the inherent problems in designing public graphic systems, exhibit graphics, corporate and institutional graph-

ics, promotional and technical literature graphics, and learn skills in effective problem-solving techniques and concept development. *Prereq.* ART 1132 and ART 1134.

ART 1245 Environmental Design 4 QH

Explores the development and application of architectural graphics to the built environment. Offers a studio workshop setting, lectures, design projects, field trips, and readings. *Prereq.* ART 1223, or ART 1228, ART 1250 and ART 1134 or *equiv.*

ART 1250 Color Theory and Practice 4 QH

Offers a project-oriented course exploring the nature and properties of color, major color theories, color harmonies, and the spatial characteristics of color. Topics include color and light, the psychology of color, color symbolism, color orchestration, and the pragmatic creative application of color in image-making generally, and design specifically.

ART 1252 Architectural Design 3 4 QH

This intermediate architectural studio course allows the student to integrate the principles of ART 1150 and ART 1151 in projects of increasing complexity. Design projects of moderate scope emphasize the coordination of program, site, structure, environmental systems, construction processes, and materials. Both urban and suburban sites will be used for a minimum of two architectural projects that offer the student architectural design problems based on actual sites, building programs, and construction regulations.

ART 1253 Architectural Design 4 4 QH

Continues ART 1252 in the architectural studio series. Requires students to apply design principles to increasingly complex architectural problems. Focuses on mixed-use programs for urban sites in the studio's architectural design project. *Prereq.* ART 1252.

ART 1254 Intermediate Drawing 4 QH

Focuses on heightening the student's understanding of spatial awareness, scale movement, and expression. Students will be asked to create unusual environmental situations for their figurative compositions. A variety of media will be used, including wash, pen and ink, watercolor, chalk, charcoal, and pencil. *Prereq.* ART 1124 or *equiv.*

ART 1256 Theory of Structures I 4 QH

Introduces the theory of materials and structures. Examines basic structural elements in masonry and wood construction. Uses historic and current building types to explore the relationship between structure, materials, construction process, and architectural space. Includes lectures, discussions, field trips, and student presentation of structural models and diagrams. *Prereq.* PHY 1222.

ART 1257 Theory of Structures 2**4 QH**

Continues ART 1256, combining the basic structural elements to develop structural systems. Explores form, stability loading, and materials in relation to the design of foundation, structural steel, reinforced concrete, timber, frame, space frame, and shell systems. *Prereq.* ART 1256 and PHY 1222.

ART 1261 Intermediate Black and White Photography**4 QH**

The second-level black and white photography studio/lab course with emphasis on combining personal aesthetic choices with refined darkroom skills. The zone system for roll film cameras, toners, fiber based papers and alternative film choices will be demonstrated and assigned. A final portfolio is required for successful completion of the course. Lab fee. *Prereq.* ART 1160 or equiv.

ART 1263 Introduction to Color Photography**4 QH**

Introduces shooting, processing, and printing color negative films. Lectures cover basic color theory in relationship to photography as well as contemporary color photographic processes. Working with color negative films, students get hands-on experience in the C-41 process for developing film and the EP-2 process for printing color negatives. Weekly assignments emphasize solving technical and aesthetic problems inherent in dealing with color negative materials. Hands-on labs allow students to produce final projects. Color chemistry and facilities are provided. Lab fee. *Prereq.* ART 1160 or equiv.

ART 1265 Color Slide Production and Printing**4 QH**

Introduces shooting, processing, and printing color slide films. Lectures include slide presentations, demonstrations of the E-6 and Cibachrome processes, and critiques of student work. Weekly assignments emphasize solving technical and aesthetic problems inherent in dealing with color slide materials. Hands-on labs allow students to produce final projects. Color printing supplies and facilities are provided for student use. Lab fee. *Prereq.* ART 1160 or equiv.

ART 1268 Photography as a Career**4 QH**

Introduces the varied career options available in the field of photography. Discusses photo lab management, editorial (collateral) photography, advertising photography, multimedia, and fine arts photography. Examines each career option within the context of lectures and visual presentations, and field trips to studios, businesses, and gallery locations. Studies the different tracks from an aesthetic as well as a marketing/business perspective.

ART 1271 Animation Workshop**4 QH**

Introduces the creative possibilities of the animated film. Weekly lab assignments and a final project acquaint students with various animation techniques and the creative advantages of each. Includes film screenings, lectures, and critiques. Equipment supplied by the department.

ART 1280 Media Graphics**4 QH**

Offers a project-oriented interdisciplinary course exploring the basic methods of producing graphic

design for the video medium and audiovisual systems. Focuses on the problems of designing graphics in motion. Includes screenings, lectures, and critiques. Facilities and equipment are provided. Lab fee. *Prereq.* ART 1131 and ART 1180 or equiv.

ART 1281 Video Project**4 QH**

Offers focused, in-depth creative work in the video medium. Involves students in developing a major video project from a category of their choice: experimental, fiction, narrative, or documentary. Includes lectures, screenings, discussions, and weekly critique of student work. *Prereq.* ART 1190.

ART 1290 Electronic Publishing Design**4 QH**

Introduces the creative potential of designing within an electronic publishing environment. Explores studio problem issues of content, quality, and aesthetics in electronic medium. Includes readings, lectures, and critiques. Lab fee. *Prereq.* ART 1132 and ART 1190 or equiv.

ART 1291 Intermediate Computer Graphics Workshop**4 QH**

Offers an interdisciplinary course that further explores the creative potential of computer graphics applications. Students work with various input and output devices and become acquainted with the artistic potential of each interface. Organized as a studio/seminar workshop. Lab fee. *Prereq.* ART 1190 or equiv.

ART 1295 Computer-Aided Design**4 QH**

Introduces CAD processes for two- and three-dimensional modeling for architectural design. Studies computer-aided design techniques that support site and program analysis concept and schematic design, and design development and construction drawing applications.

ART 1310 Seminar in Modern Architecture**4 QH**

Explores contemporary issues in architectural theory, design, and practice. Examines historical forces and contemporary criticism to define the nature of modernism and post-modernism. Focuses on such architects as Louis Kahn, IM Pei, Philip Johnson, Robert Venturi and Denise Scott-Brown, Michael Graves, and Frank Gehry. *Prereq.* ART 1228 or permission of instructor.

ART 1330 Advanced Visual Communication**4 QH**

Presents an advanced interdisciplinary studio seminar in visual and media design. In a chosen area of specialization, students explore their capabilities through the practical application of conceptual and technical skills. Lab fee. *Prereq.* Permission of instructor.

ART 1355 Environmental Systems**4 QH**

Surveys the environmental systems of power, air, water, waste, and light as integral elements of architecture. Discusses the theory and practice of these systems in architectural design. Considers historical and contemporary examples of building systems that illustrate the function, technology, and aesthetics of environmental systems. Includes field trips, lectures, and individual student research projects. *Prereq.* ART 1252.

ART 1363 Advanced Photography Seminar 4 QH

Through close interaction with the teacher, students are asked to refine their technical skills and to make meaningful decisions about their relationship to the world around them through the use of black and white and/or color photography. Portfolio preparation, alternative processes, and large format will be combined to form a base of skills with which to present the student's work to a larger photographic community. This course stresses individual direction and a qualitative approach to substantive photography. Lab fee. *Prereq. Permission of instructor.*

ART 1713 Modern Art: Honors 4 QH

Combines in-depth investigation of selected modern artists and movements with an overview of the

diverse meanings and functions of modern art. Involves developing and presenting individual research projects. *Prereq. Honors status or permission of instructor.*

**ART 1800, ART 1801, ART 1802 4 QH each
Directed Study**

Offers independent work under the direction of members of the department on a chosen topic. Limited to qualified junior and senior students majoring in art, with approval of the department.

**ART 1810, ART 1811, ART 1812 4 QH each
Junior/Senior Honors Program**

For details contact the Honors Office, 213 Lake.

Biology

For specific information about terms during which courses are offered, students should inquire at the main office of the biology department, 414 Mugar Building. This is especially the case for students wishing to carry a minor in biology, since some courses acceptable only for a minor do not appear in the quarterly Elective Course Selection booklets. Students should note that courses are presented by category and are not listed in a single numerical sequence.

Students should be aware that two (or more) courses with substantially the same content may not be counted toward quantitative graduation requirements. Some instances of overlap between biology courses are noted in the individual course descriptions below. However, in addition, certain combinations of courses (for example, BIO 1150 and BIO 1151 and BIO 1253, BIO 1254, and BIO 1255) may cover essentially the same material, and certain courses in other departments of the University may duplicate certain biology courses. If a student is not sure whether particular courses overlap, the student should seek advice from departmental advisers or the Office of the Dean.

Numbers in parentheses within course descriptions refer to core curriculum categories listed on page 2.

The following courses are primarily for students with little or no background in college science and mathematics. These courses are not open to biology majors.

BIO 1111 Environment and Man 4 QH

Offers an ecological analysis of man's interaction with other organisms. Presents the necessary foundation of biological principles. *Not open to biology majors.*

BIO 1150 Human Anatomy and Physiology 1 5 QH

Focuses on cellular and tissue structure and function, and anatomical terminology. Topics include histology, anatomy, and physiology of bones, muscles, blood, and nervous systems. Lab includes a study of human bones, cat dissection, and related histology. Lab fee. *Not open to biology majors.*

BIO 1151 Human Anatomy and Physiology 2 5 QH

Covers anatomy and physiology of the respiratory, digestive, urogenital, and circulatory systems; physiology of endocrine system; a brief exploration of the anatomy and physiology of eye and ear. Lab includes studies of muscle and nerve physiology, blood physiology and histology, and physiology of respiration. Lab fee. *Prereq. BIO 1150; not open to biology majors.*

BIO 1152 Integrated Human Anatomy and Physiology 1 4 QH

Introduces students to human anatomy and physiology. Focuses on cell and tissue structure and function; and anatomy and physiology of the integument, nervous system, vision and hearing, and skeletal system. Lab.

BIO 1153 Integrated Human Anatomy and Physiology 2 4 QH

Presents the structure and function of the following systems: muscular, endocrine, reproductive, vascular, and immune. Lab includes cat dissection.

BIO 1154 Integrated Human Anatomy and Physiology 3 4 QH

Presents the structure and function of the cardiovascular, respiratory, urinary, and digestive systems and the regulation of metabolism and body temperature. Lab includes cat dissection. *Not open to biology majors.*

BIO 1181 The Human Organism 4 QH

Designed for nonscience majors, introduces the structure and function of the human body. Emphasizes the principles of biological and physical science as they relate to life processes in health and disease.

Lab experiments explore the workings of the students' own biological systems rather than those of other animals. Lab fee. (II) *Not open to biology majors.*

BIO 1187 Biology of Human Reproduction 4 QH

Covers structure and function of male and female reproductive systems; factors affecting sexual development, fertility, and reproductive behavior in the human species; physiology of coitus, fertilization, pregnancy, birth, and lactation; methods of controlling fertility; and sexually transmitted diseases. (II) *Not open to biology majors.*

The following courses are primarily for students majoring in science- or health-related professions or other majors (nonbiology) with equivalent background in college science and mathematics. These courses are not open to biology majors.

BIO 1112 Ecological Principles 3 QH

Identical to BIO 1211, but without lab. *Not open to biology majors.* (II) *Prereq. Nonbiology science majors or engineering majors.*

BIO 1115 Introduction to Human Biology 4 QH

Introduces students to cell biology, genetics, and animals, such as roundworms, that cause health problems. Lab. *Not open to biology majors.*

BIO 1120 Basic Microbiology 4 QH

Microbial life, emphasizing morphological characteristics, physiological activities, and disease production. Lab. (Overlaps BIO 1320, BIO 1121, and BIO 1221.) Lab fee. *Prereq. BIO 1140, or permission of instructor; not open to biology majors.*

BIO 1121 Introductory Microbiology 3 QH

Same as BIO 1120, but without lab. *Not open to biology majors.*

BIO 1140 Basic Animal Biology I 4 QH

Covers principles of biology; universal properties and processes of living organisms as exemplified by the cell and its activities; inheritance evolution; and environmental relationships. Lab. Lab fee. (Overlaps BIO 1106.) *Not open to biology majors.*

BIO 1141 Basic Animal Biology 2 4 QH

Offers systematic, comparative study of the structure and functions of animals. Considers the diversity of animals from the standpoint of evolutionary adaptation. Lab. Lab fee. (Overlaps BIO 1107.) *Prereq. BIO 1140; not open to biology majors.*

BIO 1171 Focus on the Sea: Issues and Nature 2 QH

Explores marine conservation issues through lectures, discussion, and field trips to coastal habitats and islands. Studies the sea from ecological, economic, and literary perspectives.

BIO 1175 Introduction to Marine Biology 4 QH

Offers a broad introduction to the field emphasizing principles of oceanography and marine biology. Presents the physical, geological, and biological aspects of the ocean. Discusses the diversity of marine life and how organisms interact within different marine communities. *Not open to biology majors.*

BIO 1221 General Microbiology 3 QH

Same as BIO 1320, but without lab. Not applicable for the biology major or graduate credit. *Prereq. Permission of instructor; or CHM 1265, BIO 1260, and BIO 1261; required courses may be taken concurrently.*

BIO 1255 Human Anatomy 4 QH

Focuses on the structure and development of the human body. Lab. Lab fee. *Not open to biology majors.*

Courses primarily for biology majors or for other students with equivalent background in college science and mathematics. Freshmen intending to major in biology should take the sequence BIO 1103 to BIO 1105.

BIO 1103 Principles of Biology 1 5 QH

Introduces the basic principles of biology, offering an information base for the remainder of the biology core. Topics include scientific method, cell metabolism, growth, development, elementary genetics, nutrition, photosynthesis, and respiration. Lab. Lab fee.

BIO 1104 Principles of Biology 2 5 QH

Topics include structure and function of animals, structure and general physiology of animal cells, and evolution of adaptive diversity of animals. Lab. Lab fee. *Prereq. BIO 1103.*

BIO 1105 Principles of Biology 3 5 QH

Discusses the molecular mechanisms of microbial and plant life. Introduces the various systems of plants and their role in the biological world, illustrated with lab experiments and dissection. Lab fee. *Prereq. BIO 1103 and BIO 1104.*

BIO 1106 General Biology 4 QH

Focuses on universal properties and processes of living organisms. Topics include cellular composition and cellular control, the evolutionary process, and environmental relationships. Lab. Lab fee. (Normally not for freshman biology majors. Overlaps BIO 1140.)

BIO 1107 Animal Biology 4 QH

Offers a systematic comparative study of the structure and functions of animals. Considers the diversity of animals from the standpoint of evolutionary adaptation. Lab. Lab fee. (Normally not for freshman biology majors. Overlaps BIO 1141.) *Prereq. BIO 1106.*

BIO 1133 Plant Biology 4 QH

Introduces the structure of plant cells, structure and function of roots, stems, and leaves of flowering plants. Survey of the major groups in the plant kingdom, including their morphology, reproductive biology, and economic importance. Lab. Lab fee. *Prereq. BIO 1106 and BIO 1107 or BIO 1103 through BIO 1105.*

BIO 1211 Environmental and Population Biology 4 QH

Considers the physicochemical factors influencing and influenced by organisms. Covers interactions among individual organisms and among species;

change of species by genetic natural selection; development of communities and function of ecosystems. Lab. Lab fee. (II) *Prereq.* BIO 1107 and BIO 1133 or BIO 1103 through BIO 1105.

BIO 1253 Human Physiology 1 4 QH
Offers study of the physiology of excitable cells and tissues: nerve and muscle synapses, muscular contraction, neuromuscular reflexes, autonomic nervous system, endocrinology, sensory physiology, and higher nervous function. Lab. Lab fee. *Prereq.* BIO 1106 and BIO 1107 or BIO 1103 through BIO 1105.

BIO 1254 Human Physiology 2 4 QH
Offers study of respiration and circulation: fluids, the heart, cardiovascular regulatory mechanisms and metabolism, gastrointestinal function, renal function. Lab. Lab fee. *Prereq.* BIO 1253.

BIO 1260 Genetics and Developmental Biology 4 QH
Focuses on elaboration of the classic laws of heredity, cytogenetics, molecular basis of heredity, and selected examples of the development of form and function. Lab. Lab fee. *Prereq.* BIO 1107–BIO 1133 or BIO 1103–BIO 1105 and CHM 1264.

BIO 1261 Cell Physiology and Biochemistry 4 QH
Topics include basic chemical and physical enzyme kinetics; processes of cells related to their fine structure; oxidative and intermediary metabolism; photosynthesis, membrane phenomena; chemical and physical processes of prokaryotic and eukaryotic cells. Lab. Lab fee. *Prereq.* BIO 1107 or BIO 1103–BIO 1105 and BIO 1260, CHM 1265, and CHM 1221.

BIO 1270 Diving Research Methods 4 QH
A field-oriented course designed to introduce students to techniques in the study, ecology, and physiology of subtidal marine organisms. The course will consist of the description of underwater research methods, their appropriate applications, and their implementation during field exercises under water. Topics to be covered include diving physiology, sampling design, experimental design, statistical analysis of data, population censusing methods, under water measurements of hydrodynamics, *in situ* respirometry, underwater telemetry, underwater photography, and the use of underwater habitats and submersibles in research. Lab fee. *Prereq.* Scuba certification.

BIO 1311 Evolution 4 QH
Focuses on evolutionary history, evidence, mechanisms, and theories. Topics of current interest in evolution are emphasized. Lab fee. *Prereq.* BIO 1107 or BIO 1103 and BIO 1260.

BIO 1312 Marine Ecology 4 QH
Studies marine habitats and organisms. Focuses on primary and secondary productivity, and community structure and dynamics. Emphasizes through field work the Pacific Northwest intertidal and shallow subtidal communities. Oregon East/West program. *Prereq.* Two years of college biology.

BIO 1320 General Microbiology 5 QH
Provides morphological, ecological, and biochemical consideration of representative groups of bacteria.

Introduces virology and microbial genetics; host-parasite relationships, including basic immunological considerations; prokaryotes of medical significance; and physical and chemical controls of microbial growth. Lab. (Overlaps BIO 1120 and BIO 1221.) Lab fee. *Prereq.* Permission of instructor; or CHM 1265, BIO 1260, or BIO 1261; required courses may be taken concurrently.

BIO 1328 The Microbial World 4 QH
Studies the position, structure, and function of microorganisms in the natural world, and their utilization by humans from the perspective of their major physiological properties. Lab. Lab fee. *Prereq.* BIO 1211 and CHM 1264.

BIO 1329 Marine and Fresh Water Microbiology 1 2 QH
Examines methodological approaches to the study of the aquatic environment. Shipboard sampling and relevant field trips augment lab studies. Lab fee. *Prereq.* BIO 1320.

BIO 1330 Marine Botany 4 QH
Explores taxonomy of the major groups of marine plants, primarily algae. Investigates ecological and reproductive strategies, economic importance, and roles in diverse marine communities. Mandatory field trips in addition to lab. Lab fee.

BIO 1341 Vertebrate Zoology 4 QH
Emphasizes the systematics, natural history, zoogeography, and behavior of all classes of vertebrates. Labs consist of study of specimens and field and museum trips. Lab fee. *Prereq.* BIO 1107 or BIO 1104 and BIO 1211.

BIO 1347 Embryology 5 QH
Topics include gametogenesis, fertilization, cleavage, gastrulation, induction, organogenesis, and metamorphosis in vertebrates. Emphasis is on frog, chick, and pig in the lab. Lab fee. *Prereq.* BIO 1107 or BIO 1105 and BIO 1260.

BIO 1348 Animal Histology 4 QH
Offers microscopic study of fundamental types of animal tissues. Lab. Lab fee. *Prereq.* BIO 1105 or BIO 1107.

BIO 1351 Comparative Vertebrate Anatomy 5 QH
Focuses on morphology and phylogeny of the vertebrates. Lab studies taxonomy of the group and specific morphology of the dogfish shark, the mud puppy, the alligator, and the cat. Lab fee. *Prereq.* BIO 1105 or BIO 1107.

BIO 1370 Marine Invertebrate Zoology 5 QH
Topics include functional morphology, systematics, ecology, and phylogenetic relationships of the major invertebrate phyla. Lab emphasizes utilization of living marine forms, with dissection of representative organisms. Lab fee. *Prereq.* BIO 1105 or BIO 1107.

BIO 1371 Biological Oceanography 4 QH
Offers labs and lectures encompassing the principles of biological oceanography. Topics include physical and chemical aspects of the ocean environment, the distribution, production, and interactions of marine

planktonic organisms, and ecosystem characteristics of specific oceanographic environments. Emphasizes participation in sampling and analysis using current instrumentation and methods. Lab fee. *Prereq.* BIO 1104, BIO 1107, or BIO 1141 or equiv.

BIO 1401 Histological Technique 3 QH
Explores general methods of tissue preparation for purposes of microscopic study. Topics include preparation of solutions and stains, the microtome and its operation, together with specific directions for fixation, clearing, hardening, embedding, section cutting, and staining tissues. Lab. Lab fee. *Prereq.* BIO 1105 or BIO 1107.

BIO 1411 Tropical Terrestrial Ecosystems 3 QH
Introduces students to the plants, animals, and ecosystems of terrestrial Jamaica. *Prereq.* Two years of college biology.

BIO 1412 Benthic Marine Ecology 4 QH
Examines the interactions among bottom-dwelling invertebrates, fish, and plants and their environment. Quantitative field methods and new developments in ecological theory will be applied to examinations of the rocky intertidal zone, soft sediment areas, salt marshes, and the rocky subtidal zone. Lab fee. *Prereq.* BIO 1211; BIO 1341 recommended.

BIO 1420 Microbial Physiology 4 QH
Focuses on structure and function of the bacterial cell, emphasizing its general properties as well as on the physical and chemical factors that influence it. Lab. Lab fee. *Prereq.* BIO 1320 or equiv.

BIO 1421 Medical Virology 4 QH
Examines fundamental characteristics of animal viruses with emphasis on pathogenesis, clinical pathology, and epidemiology of the common viral diseases, including the tumor viruses and the slow viral diseases. Lab sessions focus on methods of working with animals, eggs, and cell cultures in isolating, cultivating, and identifying viruses. Lab fee. *Prereq.* BIO 1320.

BIO 1422 Medical Virology Laboratory 0 QH
Laboratory component of BIO 1421, Medical Virology.

BIO 1427 Medical Microbiology 4 QH
Topics include host parasite interactions: virulence, toxins, natural flora, immunological responses; characteristics of the common bacterial, rickettsial, and protozoal infections in humans; epidemiology, pathology, vaccines, and chemotherapy. Lab fee. *Prereq.* BIO 1320 or equiv.

BIO 1429 Marine and Fresh Water Microbiology 2 2 QH
Focuses on characterization and differentiation of aquatic micro-organisms. Topics include microbial associations in marine, estuarine, and fresh water habitats. Morphology, physiology, and ecology are stressed. Lab fee. *Prereq.* BIO 1329.

BIO 1430 Plant Physiology 4 QH
Focuses on the physiology and biochemistry of plants as a whole and at the cellular and organ levels. Considerations of mineral and nutrition, photosynthesis, hormones, growth, and development are

included. Attendance at a weekly four-hour lab, as well as preparation of a paper based on the research literature, is required. *Prereq.* BIO 1105 or BIO 1133 and CHM 1265.

BIO 1431 Lower Plants 4 QH
Offers study of nonvascular plants (algae, fungi, lichens, mosses, and liverworts), including their morphology, ultrastructure, ecology, life cycles, reproductive strategies, and economic uses. Lab. Lab fee. *Prereq.* BIO 1105 or BIO 1133.

BIO 1432 Higher Plants 4 QH
Offers study of vascular plants (club mosses, ferns, gymnosperms, and angiosperms). Origin, ecology, development, structure, paleobotanical evidence, reproductive strategies, and economic uses. Field trips included. Lab. Lab fee. *Prereq.* BIO 1105 or BIO 1133.

BIO 1437 Structural Botany 4 QH
Focuses on comparative developmental anatomy of seed plants. Lab. Lab fee. *Prereq.* BIO 1105 or BIO 1133.

BIO 1438 Flora of New England 4 QH
Examines local vascular flora (ferns, gymnosperms, and angiosperms), with emphasis on recognition and appreciation of plant family characteristics. Presents preparation of herbarium specimens. Field trip attendance is required. Lab. Lab fee. *Prereq.* BIO 1105 or BIO 1133.

BIO 1439 Economic Botany 4 QH
Offers an in-depth study of the association of plants and men. Subjects include food, beverage, drug, fiber, and medicinal products and crops, both historically and in present-day usage. Lab includes making of several plant products (paper, dried fruit, beer, etc.) as well as tours of a brewery, wholesale grocers, ethnic markets, sugar factory, and other places as time permits. Lab fee. *Prereq.* BIO 1133, or BIO 1103–BIO 1105.

BIO 1440 Advanced Invertebrate Zoology 4 QH
A lecture, field, and lab course that concentrates on one or two phyla. Subject varies from year to year, depending upon expertise of available faculty. An individual research project is required. Lab fee. *Prereq.* Two years of college biology.

BIO 1441 Parasitology 4 QH
Focuses on symbiotic relationships of protozoans, mesozoans, flatworms, nematodes, acanthocephalans, and arthropods. Lab. Lab fee. *Prereq.* BIO 1107 or BIO 1105 and BIO 1260.

BIO 1442 Vertebrate Paleontology 4 QH
Examines evolution of the vertebrates, including humans, as revealed through the fossil record. Lab, museum, and field studies. Lab fee. *Prereq.* BIO 1107 or BIO 1105, BIO 1211, BIO 1260; or permission of instructor.

BIO 1443 Tropical Terrestrial Ecology 4 QH
Introduces students to the plants, animals, and ecosystems of terrestrial Jamaica in lectures and in the field.

BIO 1446 Ornithology 4 QH

A study of the phylogeny, anatomy, physiology, behavior, and ecology of birds. Field observation, lab preparation, and study of specimens are included. Lab includes on-campus study and field trips. Lab fee.

BIO 1447 Herpetology 4 QH

Lectures emphasize the natural history, behavior, systematics, and zoogeography of recent amphibians and reptiles. Lab consists of identification and preparation of specimens, particularly local species. Mandatory field trips. Lab fee. *Prereq.* BIO 1105 or BIO 1107, and BIO 1260.

BIO 1448 Mammalogy 5 QH

Offers study of phylogeny, anatomy, physiology, and natural history of mammals. Field collection, lab preparation, and study of specimens are included. Lab. Lab fee. *Prereq.* BIO 1104 or BIO 1107, and BIO 1211.

BIO 1449 Marine Birds and Mammals 4 QH

Focuses on the phylogeny, systematics, zoogeography, morphology, physiology, reproduction, behavior, and ecology of birds and mammals associated with the marine environment, with lab emphasis on species that occur along the New England coast. Labs include identifying, dissecting, and preparing specimens. Lab fee. *Prereq.* BIO 1211 and BIO 1104, BIO 1107, or BIO 1141.

BIO 1450 Immunology 4 QH

Provides an overview of the structure and function of genes, proteins, and cells involved in the generation of the immune response. Emphasizes molecular immunology and immunogenetics. *Prereq.* BIO 1261. *Take concurrently with BIO 1467.*

BIO 1452 Comparative Neurobiology 4 QH

Focuses on structure and function in simple invertebrate nervous systems. Topics include parallel conductance theory at endogenous and synaptic potentials, nerve networks, simple sensory and motor systems. Lab fee. *Prereq.* BIO 1261.

BIO 1453 General Physiology of Invertebrates 4 QH

Basic animal functions as manifested among the major groups of invertebrates, with comparisons to the vertebrates, especially aquatic vertebrates. The course considers the cellular and biochemical bases for the functions, their control, their adaptiveness to diverse environments, and their evolutionary implications. Topics usually include: respiration, circulation, nutrition, metabolism, excretion, salt and water balance, temperature responses, biological clocks, sensory organs, and various effector organs. Lab fee. *Prereq.* BIO 1261.

BIO 1454 Comparative Vertebrate Physiology 4 QH

Considers physiological principles in the context of the phylogenetic diversity of the vertebrates, with emphasis on adaptations of animals to aspects of their life histories and environments. Comparisons with invertebrate systems will be made when appropriate. Major themes to be considered include: energetics, temperature, circulation, respiration, skeletal muscle, and salt and water balance. Lab. Lab fee. *Prereq.* BIO 1261.

BIO 1457 Neuroethology 4 QH

A lecture, field, and lab course concentrating on the mechanisms underlying behavior of model invertebrates and lower invertebrates. The overall goal will be to develop a framework to explain behavior in terms of properties and connectivity of neuronal circuits. Topics to be covered include: the cellular biology of neurons and neuronal circuits, the organization of sensory and motor systems, and field and lab analysis of simple behaviors. Lab fee. *Prereq.* BIO 1105.

BIO 1460 Current Concepts in Cell Biology 4 QH

Examines selected topics in cellular structure and function of eukaryotes, for example, their electrical and mechanical characteristics and the underlying physical and biochemical processes. Topics will vary depending upon the instructor. Lab. Lab fee. *Prereq.* BIO 1261 and physics.

BIO 1461 General Biochemistry I 4 QH

Surveys biochemistry, emphasizing protein structure, the nature of enzymic catalysis, bioenergetics, and the metabolism of carbohydrates, lipids, and amino acids. *Prereq.* BIO 1260 and organic chemistry.

BIO 1462 General Biochemistry Laboratory 4 QH

Introduces modern research techniques used in biochemistry and molecular biology. Topics include purification and characterization of proteins, kinetic properties of enzymes, isolation of high molecular weight DNA, recombination of DNA molecules *in vitro*, isolation of bacterial clones containing recombinant molecules, and *in vitro* mutagenesis. Covers safety and moral concerns raised by genetic engineering. Includes two hours of lecture and seven hours of lab. *Prereq.* BIO 1461.

BIO 1463 General Biochemistry 3 4 QH

Emphasizes the structure and function of organelles, mechanisms of hormonal control of metabolism, and gene regulation. *Prereq.* BIO 1461, BIO 1467.

BIO 1465 Introductory Immunology 3 QH

Covers basic consideration of the physical and chemical attributes of antigens and antibodies. Antigens of biological significance as well as *in vivo* antigen-antibody interactions are discussed. *Prereq.* BIO 1261.

BIO 1466 Immunology Laboratory 2 QH

Provides lab exercises dealing with immunization, quantitative antigen-antibody reactions, electrophoretic studies (agar, acrylamide gel, and cellulose acetate), immuno-fluorescence. Lab fee. *Prereq.* BIO 1465 taken concurrently.

BIO 1467 Molecular Biology 4 QH

Emphasizes experimental design and proof in macro-molecular chemistry and genetics. Studies current theories of the detailed molecular mechanisms for the preservation, expression, and evolutionary development of biological information. Applications to general biological and health problems will be emphasized. A two-hour period each

week will be devoted to problem solving, research "game playing," and model building. *Prereq.* BIO 1261.

BIO 1470 Coastal Biology (Oregon Coast) 4 QH

The first of a series of three courses intended to introduce the student to a wide range of coastal environments. This course includes studies of the open ocean, rocky intertidal areas, sandy beaches, and estuarine environments of the Oregon coast. Basic biological principles will be demonstrated through comparative studies.

BIO 1471 Coastal Biology (Caribbean Coast) 4 QH

The second of a series of three courses intended to introduce the student to a wide range of coastal environments. This course includes studies of the open ocean, rocky intertidal areas, sandy beaches, and estuarine environments of the Caribbean. Basic biological principles will be demonstrated through comparative studies.

BIO 1472 Coastal Biology (New England Coast) 4 QH

The third of a series of three courses intended to introduce the student to a wide range of coastal environments. This course includes studies of the open ocean, rocky intertidal areas, sandy beaches, and estuarine environments of the New England coast. Basic biological principles will be demonstrated through comparative studies.

BIO 1475 Biology and Ecology of Fish 4 QH

Examines the ecology, evolution, systematics, and behavior of fish. Uses field study, lectures, and labs. Studies specimens taken from New England waters. Lab fee. *Prereq.* Two years of college biology.

BIO 1477 The Biology of Corals 4 QH

A field, lecture, and lab course which concentrates on tropical cnidaria. The course will study the sys-

tematics, anatomy, physiology and ecology of this group of animals which assume such an important role in tropical marine ecosystems. *Prereq.* Two years of college biology.

BIO 1478 The Biology of Fish 5 QH

A field, lecture, and lab course that examines the systematics, anatomy, behavior and ecology of fish. Tropical forms are emphasized. *Prereq.* Two years of college biology.

BIO 1479 Adaptations of Aquatic Organisms 4 QH

An exploration of aquatic organisms through a study of their evolutionary responses to the aquatic habitat. The physical properties of water create physical constraints that have affected form, function, and behavior of all aquatic organisms. Density, viscosity, diffusion rates, pressure effects, and elementary fluid mechanics will be used to explain such characteristics as the body shape of larvae, hearing and sound production, suspension feeding, and buoyancy. Course includes lectures, labs, demonstrations, and individual research projects. *Prereq.* Two years of college biology.

BIO 1480 Senior Biochemistry Seminar 1 QH

Examines recent developments in various topics of biochemistry. Emphasizes student presentation and analysis.

BIO 1490 Senior Seminar 1 QH

The course examines recent developments in various topics of zoology, microbiology, physiology, botany, ecology, genetics, and cell biology. Student presentation and analysis are emphasized. Limited to qualified juniors and seniors in the BA program and required of seniors in the BS program. *Prereq.* Completion of "Biocore" BIO 1103 and BIO 1261.

Chemistry

Please note some courses in the College of Arts and Sciences are duplicated in different departments or colleges, or within a department. You may not receive credit for two such courses. If you have a question about whether one course does overlap with another, please consult the departments involved and the Office of the Dean before taking the course.

Numbers inside parentheses within course descriptions refer to core curriculum categories listed on page 2.

Introductory Chemistry Courses

CHM 1100 Special Topics in Chemistry 4 QH

Examines fundamentals and applications of chemistry of particular interest to students in business. Discusses atomic theory, chemical bonding and reactions, states of matter and common chemicals, and foundations of organic chemistry. Makes applications to plastics and polymers, biochemistry, semiconductors, and nuclear power.

CHM 1101 General Chemistry for Health-Related Majors 1 4 QH

Examines topics in inorganic chemistry of interest to students in health-related majors. Topics include

atomic structure; energy changes in physical and chemical processes; stoichiometry; chemical bonding; gases, liquids, and solids; solutions; acids and bases. Emphasizes how such ideas are related to the chemistry of the body.

CHM 1102 General Chemistry for Health-Related Majors 2 4 QH

Introduces organic substances of biological significance and discusses the structure and reactions of proteins, carbohydrates, lipids, and nucleic acids as well as the major pathways of metabolism. *Prereq.* CHM 1101.

CHM 1110 General Chemistry Preliminaries 5 QH

Introduces general chemistry by reviewing the required computational skills, basic nomenclature, and the mole concept. *Prereq.* *Permission of the course coordinator for general chemistry for the life sciences.*

CHM 1111 General Chemistry for the Life Sciences I 5 QH

Designed for nonchemistry majors. Focuses on basic concepts and definitions: the mole concept and chemical stoichiometry, states of matter, solutions, periodicity of elements, atomic structure, and chemical bonding and reactions. Lab fee. (II)

CHM 1112 General Chemistry for the Life Sciences 2A 5 QH

For students who will not be taking further chemistry. Covers chemical equilibria; acids, bases, and buffers; introduction to the organic chemistry of compounds of biological relevance; introductory biochemistry of proteins, carbohydrates, lipids, and nucleic acids. *Prereq.* *CHM 1111.*

CHM 1112 General Chemistry for the Life Sciences 2B 5 QH

For nonchemistry majors who will be taking CHM 1264. Subjects covered include chemical kinetics and equilibria, acids and bases, elementary thermodynamics and kinetics, and electrolysis and electrochemistry. Lab fee. (II) *Prereq.* *CHM 1111.*

CHM 1130 Fundamentals of Chemistry 4 QH

Focuses on applications and principles of chemistry. Examines elementary atomic theory, physical and chemical properties of matter, chemical reactions and stoichiometry, and chemical measurements with applications in engineering technology.

CHM 1131 General Chemistry for Engineering Students I 4 QH

Primarily for engineering students. Introduces the principles of chemistry, focusing upon the states and structure of matter and chemical stoichiometry.

CHM 1132 General Chemistry for Engineering Students 2 4 QH

Primarily for engineering students. Introduces the principles of chemistry, focusing upon chemical equilibria, the nature of some common materials, and energy considerations in chemical and nuclear transformations. *Prereq.* *CHM 1131.*

CHM 1138 General Chemistry Laboratory 1 QH

Required for students planning to major in chemical engineering. Optional for other students taking CHM 1132. Experiments pertaining to lecture material. Lab fee.

CHM 1151 General Chemistry for Science Majors 1 5 QH

For chemistry majors and selected students in other majors, such as biology, physics, and so on. Focuses on basic concepts and definitions, moles, gas laws, stoichiometry, atomic structure, periodic properties, and chemical bonding. Lab fee.

CHM 1152 General Chemistry for Science Majors 2 5 QH

Topics include solutions, chemical kinetics, chemical equilibrium, chemical thermodynamics, electro-

chemistry, chemistry of the representative elements. Lab fee. *Prereq.* *CHM 1141 or CHM 1151.*

CHM 1153 The Chemical Elements 5 QH

For chemistry majors and selected students in other majors. Applies the principal concepts of chemistry (thermodynamics, chemical bonding, kinetics) to a systematic survey of the characteristic behavior of the chemical elements and compounds. Lab fee. *Prereq.* *CHM 1122, CHM 1132, CHM 1152, or equiv.*

Advanced Chemistry Courses

CHM 1221 Analytical Chemistry 4 QH

For nonchemistry majors. Covers the principles and practice of chemical methods of analysis with an introduction to spectrophotometry, ion selective electrodes, and gas chromatography. Discusses methods and applications for the fields of biology, clinical chemistry, toxicology, and environmental investigations. Lab fee. *Prereq.* *CHM 1122 or equiv.*

CHM 1231 Analytical Chemistry for Majors 5 QH

For chemistry majors. Covers the principles and practice of chemical methods of analysis with an introduction to spectrophotometry, ion selective electrodes, and gas chromatography. Examines method development, equilibrium limitations in analysis, and statistical evaluation of data as well as methods and applications for the fields of biochemistry, industrial chemistry, and chemical research. Lab fee. *Prereq.* *CHM 1152 or equiv.*

CHM 1264 Organic Chemistry for Biology Science Majors 1 5 QH

For nonchemistry majors. Covers nomenclature, preparation, properties, and reactions of common organic compounds. Lab fee. *Prereq.* *CHM 1122, CHM 1152, or equiv.*

CHM 1265 Organic Chemistry for Biology Science Majors 2 5 QH

Continues CHM 1264. Lab fee. *Prereq.* *CHM 1264.*

CHM 1268 Organic Chemistry for Pharmacy Majors 1 5 QH

For pharmacy majors. Covers nomenclature, preparation, properties, and reactions of common organic compounds. Lab fee. *Prereq.* *CHM 1122, CHM 1152, or equiv.*

CHM 1269 Organic Chemistry for Pharmacy Majors 2 5 QH

Continues CHM 1269. Lab fee. *Prereq.* *CHM 1268.*

CHM 1271 Organic Chemistry for Chemistry Majors and Chemical Engineering Students 1 3 QH

For chemistry majors, chemical engineering students, and selected students in other majors. Covers synthesis and properties of aliphatic and aromatic hydrocarbons and their functional derivatives, correlation between the structure of organic compounds and their physical and chemical properties, and electronic interpretation of organic reactions. *Prereq.* *CHM 1153 or CHM 1132 and CHM 1138.*

CHM 1272 Organic Chemistry for Chemistry Majors and Chemical Engineering Students 2 5 QH

Continues CHM 1271. Lab fee. *Prereq.* *CHM 1271.*

CHM 1273 Organic Chemistry for Chemistry Majors and Chemical Engineering Students 3

Continues CHM 1272. Lab fee. *Prereq.* CHM 1272.

CHM 1280 Physical Chemistry for the Life Sciences 1

Examines physiochemical principles as they apply to biological processes. Covers thermodynamics, kinetics, equilibria, oxidation-reduction reactions, transport processes, quantum mechanics, and spectroscopy. *Prereq.* CHM 1122, CHM 1152, or equiv.

CHM 1281 Physical Chemistry for the Life Sciences 2

Continues CHM 1280. *Prereq.* CHM 1280.

CHM 1381 Physical Chemistry 1

Introduces chemical thermodynamics. Covers the three laws of thermodynamics and their applications to thermochemistry, material equilibrium, and reaction equilibrium. *Prereq.* CHM 1132, CHM 1152, or equiv.; MTH 1223, MTH 1243, or equiv.; PHY 1223, PHY 1233, or equiv.

CHM 1382 Physical Chemistry 2

Continues chemical thermodynamics, kinetics, and transport processes. Covers theoretical concepts and practical applications of phase equilibria, quantitative use of phase diagrams, kinetic molecular theory and applications to transport processes, reaction kinetics, and mechanism. *Prereq.* CHM 1381.

CHM 1383 Physical Chemistry 3

Presents the fundamental principles of quantum mechanics and their application to chemical problems. Emphasizes applications to atomic and molecular spectroscopy. *Prereq.* CHM 1382.

CHM 1394 Experimental Physical Chemistry 1

Presents experiments that demonstrate simple yet accurate ways of measuring fundamental physical chemical phenomena. Examines treating experimental methodology and error analysis. Introduces computer-based data analysis. Emphasizes the preparation of concise and literate laboratory reports. Lab fee. *Prereq.* CHM 1381 or taken concurrently.

CHM 1395 Experimental Physical Chemistry 2

Examines experiments based on various physical chemistry topics presented in CHM 1382. Explains and demonstrates computer interfacing of experimental apparatus. Focuses on data analysis using computer-based spread sheet and analysis programs. Emphasizes preparing concise and literate laboratory reports. Lab fee. *Prereq.* CHM 1382 or taken concurrently.

CHM 1396 Experimental Physical Chemistry 3

Focuses on experiments in atomic and molecular spectroscopy and molecular photophysics that illustrate the principles discussed in CHM 1383. Emphasizes experimental methodology and preparing reports. Lab fee. *Prereq.* CHM 1383 or taken concurrently.

CHM 1422 Instrumental Methods of Analysis

For chemistry majors and selected students in other majors. Covers principles, methods, and applications of electroanalytical chemistry, optical spectroscopy, and chromatography. Includes selected topics in

instrumental design and function and in nonoptical spectroscopy. *Prereq.* CHM 1392 and CHM 1231 or permission of instructor. *Prereq.* CHM 1432 concurrently for chemistry majors.

CHM 1432 Instrumental Analysis Laboratory

For chemistry majors and selected students in other majors registered for CHM 1422. Focuses on lab experiments related to topics covered in CHM 1422. Lab fee.

CHM 1441 Inorganic Chemistry

Topics include atomic properties of free atoms and ions; ionic bonding and the structure of the solid state; the Madelung calculation; the Born-Haber and other thermodynamic cycles; valence-bond, molecular, orbital, and crystal field theories of bonding; stereochemistry of compounds of representative elements; electron-deficient compounds; and spectral and magnetic properties of transition metal compounds. *Prereq.* CHM 1393.

CHM 1461 Identification of Organic Compounds

Examines qualitative analysis of organic compounds and mixtures, using physical, chemical, and instrumental methods. Lab fee. *Prereq.* CHM 1265 or CHM 1273.

CHM 1521 Advanced Analytical Chemistry 1

Examines analytical separations. Corresponds to CHM 3521. *Prereq.* CHM 1422 or equiv.

CHM 1523 Advanced Analytical Chemistry 2

Examines the theory, practice, instrumentation, and application of selected electroanalytical methods of analysis. Corresponds to graduate course CHM 3523. *Prereq.* CHM 1422 or equiv.

CHM 1525 Advanced Analytical Chemistry 3

Covers optical methods of analysis. Corresponds to CHM 3525. *Prereq.* CHM 1422 or equiv.

CHM 1541 Advanced Inorganic Chemistry 1

Covers application of quantum chemistry to inorganic systems. Corresponds to graduate course CHM 3541. *Prereq.* CHM 1441.

CHM 1542 Advanced Inorganic Chemistry 2

Continues CHM 1541. Corresponds to graduate course CHM 3542. *Prereq.* CHM 1541.

CHM 1543 Advanced Inorganic Chemistry 3

Chemistry of the solid state. Corresponds to graduate course CHM 3543. *Prereq.* CHM 1542.

CHM 1561 Advanced Organic Chemistry 1

Focuses on organic structure and reactions. Corresponds to graduate course CHM 3561. *Prereq.* CHM 1273 or CHM 1265.

CHM 1562 Advanced Organic Chemistry 2

Examines organic structure and reactions. Corresponds to graduate course CHM 3562. *Prereq.* CHM 1561.

CHM 1563 Advanced Organic Chemistry 3

Focuses on organic structure and properties. Corresponds to graduate course CHM 3563. *Prereq.* CHM 1562.

CHM 1564 Spectrophotometric Identification of Organic Compounds 3 QH

Examines spectrophotometric identification of organic compounds. Corresponds to graduate course CHM 3564. *Prereq.* CHM 1273 or equiv.

CHM 1581 Advanced Physical Chemistry 1 3 QH

Examines chemical thermodynamics. Corresponds to graduate course CHM 3581. *Prereq.* CHM 1383.

CHM 1591 Advanced Physical Chemistry 2 3 QH

Focuses on atomic and molecular structure. Corresponds to graduate course CHM 3591. *Prereq.* CHM 1383.

CHM 1594 Advanced Physical Chemistry 3 3 QH

Explores chemical kinetics. Corresponds to graduate course CHM 3594. *Prereq.* CHM 1383.

CHM 1738 General Chemistry Laboratory 1 QH

Honors equivalent of CHM 1138.

CHM 1741 General Chemistry 1 (Honors) 4 QH

Honors equivalent of CHM 1131.

CHM 1751 General Chemistry 1 (Honors) 5 QH

Honors equivalent of CHM 1101.

CHM 1752 General Chemistry 2 (Honors) 5 QH

Honors equivalent of CHM 1152.

CHM 1800, CHM 1801, CHM 1802, CHM 1803, CHM 1804, CHM 1805 4 QH each**Undergraduate Research**

Students may conduct original experimental work under the direction of a faculty member. A minimum of a two-quarter commitment and approval of the executive officer of the chemistry department are required. *Prereq.* at least middler year chemistry major status with a minimum QPA of 2.8 in courses required for the major.

CHM 1811 Advanced Chemical Laboratory Practice 1 4 QH

Staff members direct lab projects in analytical, inorganic, organic, and physical chemistry. Approval of the executive officer of the chemistry department is required. Lab fee. *Prereq.* CHM 1273, CHM 1395, CHM 1396, and CHM 1422.

CHM 1812 Advanced Chemical Laboratory Practice 2 4 QH

Students may continue lab projects from CHM 1811 or carry out new projects in different areas. Approval of the administering committee is required. Lab fee. *Prereq.* CHM 1811.

CHM 1830 Special Topics 4 QH

Prereq. CHM 1381 and CHM 1382.

CHM 1840, CHM 1841, CHM 1842, CHM 1843**Junior/Senior Honors Program**

For details contact the Honors Office, 183 Holmes.

Cinema

The following film courses are described under the different department headings. For information about the cinema studies minor, see the section on interdisciplinary minors at the beginning of the Curriculum Guide, or call the Program in Cinema Studies, 4 Boston YMCA, 617-437-5163.

Art

ART 1170 Filmmaking Workshop
 ART 1180 Video Basics
 ART 1233 Contemporary Directions in Cinema
 ART 1235 History of Film
 ART 1236 The American Film
 ART 1238 Documentary Film
 ART 1280 Media Graphics
 ART 1281 Video Project
 ART 1800 Directed Study

English

ENG 1288 Film and Text
 ENG 1289 Shakespeare on Film
 ENG 1290 Topics in Film
 ENG 1291 Popular Culture
 ENG 1294 Modern Film
 ENG 1296 American Film and Society
 ENG 1297 Approaches to Film

History

HST 1494 History and Film
 HST 1575 History of Media in America

Interdisciplinary

INT 1320 Exploring the Humanities Through Film (core course category II)
 INT 1321 Modernism

Modern Languages

LNF 1521 French Film
 LNF 1550 Introductory Film Analysis
 LNF 1551 Film Theory (core course category V)
 LNF 1560 Film and Psychoanalysis
 LNS 1550 Spanish Film Masterpieces

Music

MUS 1139 Film Music

Sociology/Anthropology

SOA 1120 Camera on Culture

Speech Communication

SPC 1450 Television 1
 SPC 1455 Television 2
 SPC 1554 Special Topics in Broadcasting (when appropriate)

Theatre and Dance

DRA 1316 Acting for the Camera (see department listing for prerequisites)

Economics

Please note some courses in the College of Arts and Sciences are duplicated in different departments or colleges, or within a department. You may not receive credit for two such courses. If you have a question about whether one course does overlap with another, please consult the departments involved and the Office of the Dean before taking the course.

Numbers inside parentheses within course descriptions refer to core curriculum categories listed on page 2.

Unless otherwise stated, there are no prerequisites for advanced economics courses. Where prerequisites are indicated, exceptions may be granted with the instructor's permission.

ECN 1105 Principles of Macroeconomics

4 QH

Introduces students to macroeconomic analysis, which deals with the functioning of the overall economy. Topics include review of national income concepts; national income determination, fluctuation, and growth; role of the banking system and the Federal Reserve System; government expenditures and taxation; international trade; and balance of international payments.

ECN 1106 Principles of Microeconomics

4 QH

Examines the role of the market pricing system of demand and supply in determining the allocation of resources to competing uses, and why this system may not function adequately in certain cases. Study includes the application of economic principles to private and public problems.

ECN 1115 Principles of Macroeconomics

4 QH

Introduces macroeconomic analysis. Topics include the flow of national income, economic growth and fluctuation, the role of money and banking, and monetary and fiscal policies. Emphasizes the development of conceptual tools to analyze the economic problems facing modern society. (II)

ECN 1116 Principles of Microeconomics

4 QH

Focuses on development of basic theory of demand, supply, and market price. Explores applications to selected microeconomic problems, such as basic monopoly and competition, and other issues that relate to the role of the pricing system in resource allocation and income distribution. (II)

ECN 1130 Medical Economics

4 QH

Examines health-care trends in the United States and selected foreign countries, causes of the rising costs of medical care, the particular nature of the demand for health-care services, the demand for physicians and paramedical personnel, Certificate of Need committees, health maintenance organizations, medical malpractice, increases in life expectancy and its impact on society, third-party payers, and the true cost of medical education.

ECN 1140 Economics of Crime

4 QH

Covers economic analysis of crime and the criminal justice system. Topics include theoretical and empirical analysis of the economic causes of criminal behavior, the social costs of crime and its prevention, and design of enforcement policies.

ECN 1150 Economics of World Energy and Primary Resources

4 QH

Investigates economic, political, and historical backgrounds of energy and other resources problems. Analyzes future impact of primary resources limitations on United States and world economics as well as feasibility studies of resource substitution. *Prereq.* ECN 1105 or ECN 1115 and ECN 1106 or ECN 1116.

ECN 1155 Superpower Economics

4 QH

Analyzes the relative economic structures and strengths of the United States, the Soviet Union, Japan, the Common Market, and China, as well as the economic relations among these powers. Examines the impact of these relations on the domestic economies of the superpowers and of the developing nations of the world.

ECN 1170 Economic Issues In Minority Communities

4 QH

Examines the economic conditions of nonwhite minorities within the United States economy. Includes historical and cultural materials as well as specific theoretical and empirical analysis of the economic problems confronting minority communities. (VI)

ECN 1215 Macroeconomic Theory

4 QH

Investigates the conceptual and empirical problems of creating and using national accounts, price index problems, conceptual and empirical evaluation of consumption and investment functions and their policy implications, multiplier and accelerator models, and recent cyclical fluctuations. Analyzes theories of inflation, unemployment and growth in the light of recent economic history. *Prereq.* ECN 1105, ECN 1115, and MTH 1107 or equiv.

ECN 1216 Microeconomic Theory

4 QH

Examines supply-and-demand analysis, various elasticity concepts and applications, theories of demand and production, and derivation of cost curves. Analyzes pricing and output behavior in the several market structures with their welfare implications and the pricing of resources. *Prereq.* ECN 1106, ECN 1116, and MTH 1107 or equiv.

ECN 1250 Statistics I

4 QH

Discusses elementary set theory, basic probability, measurement and presentation of economic statistics, descriptive statistics, basic estimation techniques, testing statistical hypotheses, and sampling problems.

ECN 1251 Statistics 2**4 QH**

Topics include analysis of variance, correlation and linear regression analysis, multivariate regression analysis, and Bayesian decision making. *Prereq.* ECN 1250.

ECN 1310 Labor Economics**4 QH**

Focuses on economic analysis of the labor market and the labor force. Topics include the supply, development and efficient use of human resources; wage determination; the changing occupational and industrial structure; causes, nature and incidence of unemployment; the economic impact of unions, related labor market institutions and relevant public policies. *Prereq.* ECN 1106 or ECN 1116 or ECN 1105 or ECN 1115.

ECN 1311 Employment and Training Programs and Policies**4 QH**

Nature and objectives of employment and training programs, nature and causes of human resource problems, current and previous efforts to solve human resource problems in the United States, planning of human resource programs, and economic evaluation of employment and training programs. *Prereq.* ECN 1105 or ECN 1115.

ECN 1312 Women in the Labor Market**4 QH**

Focuses on economic analysis of the labor market position of women in the context of the changing economic structure and labor market institutions. Analyzes female labor force participation differences; male/female differentials in earnings and unemployment; occupational concentration, occupational segregation, theories and evidence of sex discrimination; and new opportunities for women. *Prereq.* ECN 1105 or ECN 1115 and ECN 1106 or ECN 1116.

ECN 1313 Local Labor Market Analysis and Human Resource Planning**4 QH**

Introduces methods and data sources for analyzing conditions in regional, state, and local labor markets. The primary aim is to determine the extent, nature, and causes of human resource problems and to utilize that information in planning and designing appropriate employment and training strategies. *Prereq.* ECN 1106 or ECN 1116.

ECN 1314 Economics of Education and Human Capital**4 QH**

Explores theoretical and empirical treatment of economic issues related to education and job training, including formal education (preschool through post-secondary), vocational education, on-the-job training, and government-sponsored employment and training programs. Emphasizes follow-up studies, cost-effectiveness analysis, and benefit-cost analysis for determining the effectiveness of education and training investments from a private and social standpoint. *Prereq.* ECN 1106 or ECN 1116.

ECN 1315 Income Inequalities and Discrimination**4 QH**

Focuses on economic analysis of income inequalities, poverty, and discrimination. Examines the causes of income inequality and the nature, causes and effects of poverty; economics of racial discrimi-

nation; and public welfare system and other income maintenance schemes. *Prereq.* ECN 1105 or ECN 1115 or ECN 1106 or ECN 1116.

ECN 1320 Urban Economics**4 QH**

Studies urban growth and development, intermetropolitan location of business firms, regional shifts in economic activity, intrametropolitan location of firms and households, and land use patterns. *Prereq.* ECN 1106 or ECN 1116.

ECN 1321 Urban Economic Problems and Policies**4 QH**

Focuses on economic analysis of selected urban problems such as housing, poverty, transportation, education, health, crime, and the urban environment. Discusses public policies relating to such problems. *Prereq.* ECN 1106 or ECN 1116. *Sequel to* ECN 1320. (*ECN 1320 not a prereq.*)

ECN 1322 Economics of Transportation**4 QH**

Covers transportation and land-use patterns; externalities; social costs and social benefits of various modes of transportation, ownership, regulations, and financing of various modes of transportation; and economics of new technology in transportation. *Prereq.* ECN 1106 or ECN 1116.

ECN 1330 Development Economics**4 QH**

Explores prospects for economic growth and development in poor nations as indicated by economic analysis and historical experience; social, cultural, and institutional determinants of growth; analysis of agriculture and development, the role of technological change, population; and foreign trade. (V)

ECN 1331 American Economic Development**4 QH**

Studies economic development of the United States from the colonial period to the present, historical changes in economic institutions and technologies, with special attention to preconditions of industrialism; the American Industrial Revolution, its spread and socioeconomic consequences; the Great Depression and the subsequent rise of mixed economy and welfare state; and United States adjustments to postwar economic changes.

ECN 1332 Economic History of Less Developed Countries**4 QH**

Considers the problems of initiating and sustaining economic development in selected Third World countries during the last two hundred years. Country-specific case studies cover the role of traditional economic structures, different development goals and strategies, state policies, and international economic relations. *Prereq.* ECN 1105 or ECN 1115; ECN 1106 or ECN 1116; ECN 1330 recom.

ECN 1333 European Economic Development**4 QH**

Discusses economic inheritance of the nineteenth-century development of capitalism and laissez-faire; the aftermath of the Industrial Revolution, European overseas expansion, the world wars, and the dissolution of empires; American economic conquest and European integration; the future of less developed areas in southern Europe; environmental impact of industrialism and the implications of technological society. (III)

ECN 1334 Comparative Economics 4 QH
Emphasizes competing types of theoretical economic systems; analysis of organization and operation of currently existing types of communist, socialist, and capitalist economies; comparison and evaluation of economic behavior and performance of different economic systems. *Prereq.* ECN 1105 or ECN 1115, and ECN 1106 or ECN 1116.

ECN 1335 International Economics 4 QH
Introduces the theory of international trade and payments, analysis of tariffs and commercial policy, the international monetary system, and trade and payment issues in developed and less-developed countries. *Prereq.* ECN 1115, ECN 1116, or *equiv.*

ECN 1337 History of Economic Thought 4 QH
Traces the evolution of Western economic thought. Covers several important schools in economics, examining the questions economists raise and analytical methods they use to study human behavior. *Prereq.* ECN 1105 or ECN 1115, and ECN 1106 or ECN 1116.

ECN 1340 Government Expenditures: Structure and Evaluation 4 QH
Covers fiscal functions of government, fiscal institutions and politics, theory of social goods, public expenditure growth and structure, federal budget expenditure evaluation and cost-benefit case studies, fiscal federalism in theory and practice, and issues of public debt and deficit. *Prereq.* ECN 1106, ECN 1116, or *equiv.*

ECN 1341 Financing of Government: Taxation and Debt 4 QH
Considers principles of taxation; problems of tax structure and reform at federal, state, and local levels; tax incidence; effects of taxation on economic efficiency and growth; negative income tax and social security finance; issues of public debt and deficit. *Prereq.* ECN 1106, ECN 1116, or *equiv.*

ECN 1342 Money and Banking 4 QH
Studies the nature and the functions of money, credit, and the role of financial organizations in the United States economy. Emphasizes theories of banking, money supply, and monetary policy. *Prereq.* ECN 1105, ECN 1115, or *equiv.*

ECN 1345 Business Cycles and Inflation 4 QH
Considers the theories of business cycles and inflation and an empirical application of these theories to current business cycle, inflation, and stagflation problems. *Prereq.* ECN 1105 or ECN 1115; ECN 1106 or ECN 1116; and ECN 1215.

ECN 1350 Introduction to Econometrics 4 QH
Presents an introduction to the methods of econometric analysis and forecasting. Covers ordinary least squares, piecewise regression, tests and corrections for serial correlation and heteroskedasticity, specification analysis, simultaneous equations systems, errors in variables, dynamic models and elementary forecasting. *Prereq.* ECN 1105 or ECN 1115; ECN 1106 or ECN 1116; and ECN 1251.

ECN 1351 Problems in Economic Research 4 QH
Examines research methods used by practicing economists. Discusses typical problems from applied areas of economics, including choice of modeling framework, problems of data collection, review of estimation techniques, interpretation of results, and development of static and dynamic adaptive policy models. *Prereq.* ECN 1105 or ECN 1115; ECN 1106 or ECN 1116; and ECN 1251.

ECN 1353 Introduction to Mathematics for Economists 4 QH
Introduces basic tools of mathematics, matrix algebra, differential and integral calculus and classical optimization, with special reference to economic applications. *Prereq.* ECN 1105 or ECN 1115; ECN 1106 or ECN 1116.

ECN 1360 Managerial Economics 4 QH
Explores the application of economic principles and theory, by the use of case studies, to the solution of decision-making problems in such areas as demand forecasting, price policies, estimation and control of costs, financing of capital investments, and responses to government taxation and regulation policies. *Prereq.* ECN 1106 or ECN 1116.

ECN 1361 Social Control of Economic Activities 4 QH
Focuses on the development of the government's role in economic activities, examining the relationships between the government and industry, labor, agriculture, public utilities, and consumers. Traces the changing role of the government from a laissez-faire policy to one of direct intervention in the economy. Covers such topics as wage and price control, environment and antipollution policies, consumer protection, and conglomerate mergers.

ECN 1362 Industrial Organization and Public Policy 4 QH
Presents an analytic framework and empirical study of how the structure of industrial organization and conduct of sellers and buyers affects economic performance and welfare. Includes industrial examples and case studies. Examines antitrust as a public policy designed to promote better market performances. *Prereq.* ECN 1106 or ECN 1116.

ECN 1401 Advanced Economic Theory 4 QH
Covers advanced theoretical treatment of selected topics in micro- and macroeconomics. Recommended for students planning to take graduate economics. *Prereq.* ECN 1215 and ECN 1216.

ECN 1481 Directed Study 1 QH
Offers independent work on a chosen topic under the direction of a faculty member of the department. Should not be substituted for the course requirements leading to a BA or BS degree in economics. Up to four quarter hours per offering, with an eight quarter-hour maximum. *Prereq.* Qualified senior economics majors and approval of department chair.

ECN 1482 Directed Study 2 QH
Offers independent work on a chosen topic under the direction of a faculty member of the department. Should not be substituted for the course requirements leading to a BA or BS degree in economics. Up

to four quarter hours per offering, with an eight quarter-hour maximum. *Prereq.* *Qualified senior economics majors and approval of department chair.*

ECN 1483 Directed Study **3 QH**
Offers independent work on a chosen topic under the direction of a faculty member of the department. Should not be substituted for the course requirements leading to a BA or BS degree in economics. Up to four quarter hours per offering, with an eight quarter-hour maximum. *Prereq.* *Qualified senior economics majors and approval of department chair.*

ECN 1484 Directed Study **4 QH**
Offers independent work on a chosen topic under the direction of a faculty member of the department. Should not be substituted for the course requirements leading to a BA or BS degree in economics. Up to four quarter hours per offering, with an eight

quarter-hour maximum. *Prereq.* *Qualified senior economics majors and approval of department chair.*

ECN 1492 Senior Economics Seminar **4 QH**
Coordinates and applies economic concepts, methodology, and data to issues and problems of broad social, economic, and philosophical importance. *Prereq.* *ECN 1216 and ECN 1215; senior economics majors only.*

ECN 1495, ECN 1496, ECN 1497, ECN 1498 **4 QH each**
Junior/Senior Honors Program
For details contact the Honors Office, 183 Holmes.

ECN 1715 Macroeconomics Principles (Honors) **4 QH**
Honors equivalent of ECN 1115.

ECN 1716 Microeconomics Principles (Honors) **4 QH**
Honors equivalent of ECN 1116.

English

Please note some courses in the College of Arts and Sciences are duplicated in different departments or colleges, or within a department. You may not receive credit for two such courses. If you have a question about whether one course does overlap with another, please consult the departments involved and the Office of the Dean before taking the course.

Numbers inside parentheses within course descriptions refer to core curriculum categories listed on page 2.

Unless otherwise indicated, the prerequisite for upperclass courses is a freshman English sequence. For students in the Basic Colleges this means ENG 1110 and ENG 1111; ENG 1013, ENG 1014, and ENG 1111; ENG 1110, ENG 1014, and ENG 1111. For the College of Engineering, ENG 1111 and ENG 1113. For School of Engineering Technology, ENG 1110, ENG 1111, and ENG 1114; ENG 1110, ENG 1014, ENG 1111, and ENG 1114; or ENG 1013, ENG 1014, ENG 1111, and ENG 1114. And for international students, ENG 1005 and ENG 1006.

ENG 1001 Intensive English as a Second Language
Reviews English grammar to help non-native speakers to develop listening, speaking, reading, writing, and studying skills. Includes language lab and small-group tutorials.

ENG 1004 Fundamentals of English for Non-Native Speakers **4 QH**

Provides intensive practice in composition with accent on accurate, intelligible writing and paragraphs organized around single, well-supported ideas. Encourages sentence-combining and vocabulary development, and gives special attention to individual writing needs. Includes prose readings, class discussion, and selective review of grammar. *Prereq.* *Special placement for non-native speakers whose performance or scores indicate that their writing skills are not yet up to those required for ENG 1005.*

ENG 1005 English for International Students 1 **4 QH**

Emphasizes the development of skills needed in writing clear, expository prose essays. Requires the regular writing and rewriting of essays of increasing length and complexity. Focuses on appropriate prose readings for discussion and analysis and introduces techniques preparatory to research writing. *Prereq.* *ENG 1004 or special placement.*

ENG 1006 English for International Students 2 **4 QH**

Introduces the study of literature through close reading and discussion of fiction, nonfiction, and poetry. Advances development of rhetorical techniques by requiring frequent essays written in relation to the readings and rewritten to improve content, organization, and diction. Provides guided experience with using outside sources and library materials for writing a term paper. *Prereq.* *ENG 1005 or equiv.*

ENG 1013 Fundamentals of English 1 **4 QH**

Offers an introduction to principles of the writing process. Emphasizes individualized assistance in generating and developing ideas, drafting, revising, and organizing and mastering the conventions of written English. *Prereq.* *Special placement.*

ENG 1014 Fundamentals of English 2 **4 QH**

Continues instruction in writing, emphasizing exposition, argument, and academic essay writing, as well as the conventions of English usage, punctuation, and syntax. Individualized assistance in invention, drafting, revision, and editing. *Prereq.* *ENG 1013 or ENG 1110.*

ENG 1110 Freshman English 1**4 QH**

Focuses on the individual student's writing skills. Includes application of important principles of composing, logic, and rhetoric to exposition and argumentation. Reviews sentence structure, punctuation, and paragraphing. Analyzes essay forms and problems. Students receiving a grade of *S* must take ENG 1014.

ENG 1111 Freshman English 2**4 QH**

Continues instruction in writing, with emphasis on expository methods of defining, describing, analyzing, persuading, and composing the research paper. Students write lengthy critical essays based on consideration of primary and secondary materials. Selections of poems, stories, and plays provide an introduction to literature and are the subject matter for discussion of writing technique and written assignments. ENG 1111 follows ENG 1110 and is required of all freshmen in the University. *Prereq.* ENG 1110 or ENG 1014.

ENG 1113 Great Themes in Literature**4 QH**

Explores a theme in literature through a number of illustrative works from the past and the present. Develops techniques of research and documentation.

ENG 1115 Poetry**4 QH**

Involves close reading of selected poems, study of critical terms, and practice in different critical approaches to poetry; examines techniques for reading a variety of poetic texts. (II)

ENG 1116 Fiction**4 QH**

Involves close reading of selected novels and short stories, study of critical terms, and practice in different critical approaches to fiction. (II)

ENG 1117 Drama**4 QH**

Involves close reading of selected plays, study of critical terms, and practice in different critical approaches to drama. (II)

ENG 1118 Introduction to Language and Linguistics**4 QH**

Introduces students to a new way of thinking about language. Normally, using language is as unconscious an activity as walking or chewing gum. But if we ask the right questions, we can uncover much of our unconscious linguistic knowledge: about sentence structure (syntax), meaning (semantics), word forms (morphology), and speech sounds (phonology). Understanding these will lead us to examine other issues related to language: the Black English/Standard English debate, women's and men's language, "talking" chimpanzees, "talking" computers, and the nature/nurture controversy. (II)

ENG 1119 History of the English Language**4 QH**

Studies the development of modern English from Anglo-Saxon beginnings; effects of Scandinavian and Norman invasions; dialect geography; evolutionary changes, word formation, and borrowing; and origins of writing and problems of spelling. Readings include both formal and informal writings, literary selections, wills, journals, and private and public letters. (III)

ENG 1120 Survey of English Literature 1**4 QH**

Surveys the major British writers and major literary forms and works from the Middle Ages to the end of the eighteenth century. Includes works by such writers as Chaucer, Spenser, Shakespeare, Milton, Pope, and Swift.

ENG 1121 Survey of English Literature 2**4 QH**

Surveys the major British writers and major literary movements from the romantic period through the Victorian and modern periods to the present. Includes works by such writers as Wordsworth, Coleridge, Keats, Browning, Tennyson, Yeats, Lawrence, Lessing, and Beckett.

ENG 1123 Survey of American Literature 1**4 QH**

Surveys the major American writers and major literary forms and works from the colonial period to the Civil War. Includes works by such writers as Bradstreet, Taylor, Cooper, Poe, Hawthorne, Melville, and Emerson.

ENG 1124 Survey of American Literature 2**4 QH**

Surveys the major American writers and major literary forms and works from the Civil War to the mid-twentieth century. Includes works by such writers as Whitman, Dickinson, Twain, James, Hemingway, Fitzgerald, Faulkner, and Wright.

ENG 1125 Technical Writing 1**4 QH**

Trains writers in the clear, unambiguous style of technical writing. Students practice these skills by writing technical proposals, process descriptions, feasibility and program reports, and operators' manuals. Includes oral presentations. Lab fee.

ENG 1126 Backgrounds in English and American Literature**4 QH**

Examines translation of Greek, Roman, and biblical literature as background for literary study. Emphasizes the development of myth, genre, and theme. Readings include Homer, Virgil, Ovid, the most influential parts of the Bible, and Dante. (III)

ENG 1275 Grammar for Journalists**4 QH**

Reviews the mechanics of newspaper and magazine prose. Emphasizes grammatical forms, punctuation, spelling, effective structures, and conventional usage. *Prereq.* Journalism majors only.

ENG 1276 Science Fiction**4 QH**

Traces the development of various SF themes and approaches, from early man/machine love/hate relationships to alien close encounters of all kinds. From *Frankenstein* to most recent titles. Lab fee.

ENG 1277 Topics in Science Fiction**4 QH**

Focuses on a single writer or group of writers (Wells or writers of contemporary American science fiction), a theme (women in science fiction or the future city), or a unifying idea (time travel or utopia/dystopia).

ENG 1278 Modern Bestseller**4 QH**

Explores the function of quest, romance, and adventure in a selection of contemporary bestselling fiction.

ENG 1279 The Modern Novel**4 QH**

Studies the major British and American novelists of the twentieth century. Considers theme and form in such authors as Lawrence, Woolf, Fitzgerald, Ellison, Doctorow, and Didion. (III)

ENG 1280 Modern Drama**4 QH**

Studies the development of drama from realism to surrealism, from Ibsen to Beckett.

ENG 1281 The Modern Short Story**4 QH**

Studies the short story from Poe to the present, including such writers as Joyce and Kafka, Hemingway and Flannery O'Connor.

ENG 1283 Contemporary Fiction**4 QH**

Examines British and American writers from 1945 to the present, including such figures as Lessing, Burgess, Pynchon, and Barth. Emphasizes experimental and modernist authors.

ENG 1284 Business Tradition in Literature**4 QH**

Examines the image of the business world as presented in novels and plays, biographies and autobiographies. Analyzes the cultural and historical contexts as well as the motives of the characters in society.

ENG 1285 Literature and the Law**4 QH**

Investigates the problems of crime and justice as reflected in literature, from ancient to contemporary works. The secondary focus is the law itself as literature, including explorations of case files and other legal material. The readings encourage students to discover the changing nature of the criminals—heroes or victims or villains—and to deal with the social, psychological, and political facts that define them.

ENG 1286 Literature and Politics**4 QH**

Students explore how authors from Sophocles to Mailer represent the religious, moral, and ethical conflicts arising from the acquisition, use, and misuse of political power. The literature falls into several categories: utopian, which establishes a conflict between the ideal and the real; satirical, which threatens a power structure by exposing it to scorn; analytic, which describes the rise to and fall from power of individuals, parties, or states; and investigative, which takes the reader inside a power elite to observe its inner operations. Participants examine the difference between the ideal of government and its reality.

ENG 1287 The Literature of Science**4 QH**

Examines historically the discovery methods and models of literature and science, exploring one or more of the following areas: the relationship of the methods and models of literature and science; the treatment of scientific methods and models in literature; the use of literary devices, techniques, and traditions in scientific texts. Readings will be drawn from historically significant scientific texts, literary texts, or some combination of these. (VI)

ENG 1288 Film and Text**4 QH**

Studies either the similarities and differences between literary texts and film versions of those

texts or the interrelations between film and literature as means of cultural expression during a specific historical period. For example, students might compare Doctorow's *Book of Daniel* to the film version, *Daniel*, or they might study books and movies of a period like the sixties that reflect the spirit of the era (*Catch-22*, *The Graduate*). Lab fee.

ENG 1289 Shakespeare on Film**4 QH**

Examines the various treatments of Shakespeare's plays on film. Treats the technical aspects of film and how these are used by directors to transfer Shakespeare's plays from the stage to the screen. Lab fee.

ENG 1290 Topics in Film**4 QH**

Studies a theme or problem (film and society, film and politics), a period in film history (American film from 1945 to the present), a film genre (the western, film noire), or a film director (Hitchcock, Coppola). Lab fee.

ENG 1291 Popular Culture**4 QH**

Surveys television, film, the news media, advertising, rock music, popular magazines, romance novels, commercials, etc. Studies the social meaning of the major artifacts of contemporary culture, from TV melodrama to clothing fashions. Considers culture within the system of social distinctions that derive from class hierarchies. Analyzes the way a capitalist economic system shapes the values, ideals, and meanings that are disseminated in American popular culture.

ENG 1293 Topics in Popular Culture**4 QH**

Focuses on such topics as the soap opera, the western, and the police story; on a popular culture activity; or on a popular culture perspective.

ENG 1294 Modern Film**4 QH**

A selection of major modern films from around the world will be studied from a thematic, cultural, and historical perspective. Special attention is given to political, social, ethical, and psychological issues, as well as to the way common human themes emerge in quite diverse cultures. The course also covers the basic procedures of film interpretation. Lab fee.

ENG 1300 Topics in Fiction**4 QH**

Studies a particular kind of fiction, such as the novella; a problem in fiction, such as the role of the narrator; a particular group of fiction writers; or a theme in fiction.

ENG 1301 Topics in Drama**4 QH**

Studies a particular kind of drama, a particular group of dramatists, or a theme in drama.

ENG 1302 Topics in Poetry**4 QH**

Studies a sub-genre of poetry, such as the sonnet or the dramatic monologue; a problem in poetry; a particular group of poets; or a theme in poetry.

ENG 1307 Approaches to Literature**4 QH**

Examines ancient and modern theories of literature. Includes selections from the criticism of Plato, Aristotle and the Romantics, as well as from Marxist, Freudian, Jungian, and formalist theories.

ENG 1308 Myth and Archetype in Literature 4 QH

Studies twentieth-century theories of myth and archetype as they have influenced our understanding and analysis of works of literature.

ENG 1309 Topics in Literary Criticism 4 QH

Studies a specific problem method or school of criticism, such as structuralism or archetypal criticism.

ENG 1340 Writing Workshop 1 QH

Students will write one long paper, often in conjunction with an assigned paper in another course, that will be produced in a class booklet at the end of the quarter. The course emphasizes the writing process: multiple drafts, revision, editing, and publication. *Prereq. Engineering student with at least 80 QH or permission of Middler Year Writing Office, 433 Holmes, 617-437-3964.*

ENG 1350 Intermediate Writing 4 QH

Provides writing instruction in an interdisciplinary course in which students develop papers on topics relating to their majors. Led by English faculty, students will also read and respond to essays from various disciplines. Writing will be guided in stages from proposal through finished product. Lab fee.

ENG 1351 Creative Writing 4 QH

Gives the developing writer an opportunity to practice writing various forms of both poetry and prose. Features in-class discussion of student work.

ENG 1352 Advanced Writing 4 QH

Offers an opportunity for experienced writers to hone their skills and develop their interests in different forms and subjects. *Prereq. ENG 1350 or permission of instructor.*

ENG 1357 Poetry Workshop 4 QH

Advanced workshop in writing and examining original student poetry. Students experiment in established poetic forms and compose their own work. *Prereq. ENG 1351 or permission of instructor.*

ENG 1358 Fiction Workshop 4 QH

Advanced workshop in writing and examining fiction. *Prereq. ENG 1351 or permission of instructor.*

ENG 1359 Nonfiction Workshop 4 QH

Advanced workshop in writing with focus on such forms as short essays, reviews, and profiles. *Prereq. ENG 1350, ENG 1351 or permission of instructor.*

ENG 1360 Topics in Writing: Reading and Writing Nonfiction 4 QH

Combines literary analysis and creative writing. Concentrates on subjects of twentieth-century nonfiction prose such as politics, science, "culture," athletics, and natural history. Considers authors such as Elizabeth Drew, Russell Baker, and Stephen Jay Gould.

ENG 1361 The Writing Process 4 QH

Explores writing in theory and practice. Students observe writers at work and tutor students in the Writing Center as part of the course work.

ENG 1362 Publication Arts 4 QH

Acquaints students with basic publishing skills. Each student chooses an area of specialization, such as

fiction, medicine, law, or engineering, in order to develop skill in editing manuscripts.

ENG 1370 Technical Writing 2 4 QH

Offers an opportunity for students to develop technical writing skills in a particular subject or form. *Prereq. ENG 1125 or permission of instructor.*

ENG 1371 Writing for the Computer Industry 4 QH

Focuses on computer documentation, covering general information and operating and programming instructions. Includes graphics, layout, testing, and revision. *Prereq. ENG 1125 or permission of instructor and one computer science course.*

ENG 1380 Writing for the Professions: Health Services 4 QH

Provides students in the College of Nursing and the College of Pharmacy and Allied Health Professions with instruction and practice in writing lab reports, clinical evaluations, medication analyses, HEW proposals, and other professional forms.

ENG 1381 Writing for the Professions: Business Administration 4 QH

Allows students to gain professional writing experience similar to that of the workplace. Relies on the process approach to writing and features an extended simulation, which integrates common written and oral communication through practical application. Lab fee.

ENG 1382 Writing for the Professions: Criminal Justice 4 QH

Provides students in the College of Criminal Justice with instruction in writing a variety of professional forms.

ENG 1400 Topics in Genre 4 QH

Explores several genres concurrently; or studies, cross-generically, literary modes such as satire, pastoral, or melodrama; or considers a theme in a number of different genres.

ENG 1401 Introduction to Syntax 4 QH

Offers an introduction to syntax, the structural rules of a language. Develops and tests syntactic theory which, like other scientific theories, seeks to explain why things are the way they are. The question underlying the investigation is: how do the structures of language relate to the structure of the human mind? (V)

ENG 1402 Grammars of English 4 QH

Provides a study of the rules of sentence construction in English, contrasting the traditional framework with current linguistic models. Students will have the opportunity to prepose, postpose, and extrapose as they learn to manipulate grammatical constructs.

ENG 1407 Introduction to Semantics 4 QH

Focuses on meaning and how it is expressed in language — through words, sentence structure, intonation, stress patterns, and speech acts. How do content, logic, and speakers' and listeners' assumptions affect what sentences can mean? In what ways is linguistic meaning determined by our perceptual system or our culture?

ENG 1408 Topics in Linguistics**4 QH**

Examines closely one of a range of topics from the perspective of current linguistics: American dialects, language and law, women's and men's language, words and word structures, or issues in linguistics and literature.

ENG 1409 American Novels I**4 QH**

Focuses on the themes, forms, and techniques of major American novelists of the nineteenth and early twentieth centuries, such as Cooper, Hawthorne, Melville, Twain, and James.

ENG 1410 American Novels 2**4 QH**

Studies the modern and contemporary American novel. Considers such writers as Cather, Hemingway, Fitzgerald, Faulkner, Bellow, and Baldwin. (III)

ENG 1411 English Drama I**4 QH**

Surveys representative English drama, excluding Shakespeare, from *Everyman* to Goldsmith and Sheridan. Analyzes dramatic forms as well as the role of the Elizabethan theaters, dramatic conventions, audience content, and acting styles in Restoration farces.

ENG 1412 English Drama 2**4 QH**

Surveys representative English drama of the nineteenth and twentieth centuries. Charts the development of the genre from the nineteenth century to the present and discusses themes and forms.

ENG 1550 Psychology and the Novel**4 QH**

Concentrates on twentieth-century novels and short stories that stress individual behavior and motivation and reveal human mental and emotional processes. Includes such writers as Kafka, Dostoevski, Faulkner, Conrad, and Lawrence.

ENG 1551 Gender Roles in Literature**4 QH**

Investigates the relation between sex roles and literary portrayals. Selections represent male and female writers and provide a culturally comparative perspective.

ENG 1552 Fantasy**4 QH**

Studies the theory and practice of fantasy as found in the works of such writers as Swift, Carroll, C.S. Lewis, Orwell, and Tolkien.

ENG 1557 Topics in Fantasy**4 QH**

Explores such areas as dreams, nightmares, and borderline states of consciousness in the works of such writers as Poe and Kafka.

ENG 1558 Literature in Context**4 QH**

Attempts to place the writer in the context of a special theme. For example, students might discuss a group of authors influenced by their common interest in psychoanalysis, by their social consciousness, or by an interest in the Wild West and the settlement of America.

ENG 1559 Literature in Context**4 QH**

Similar to ENG 1558 but with different texts and contexts.

ENG 1600 Topics in Literature**4 QH**

Experiments with subjects and themes such as the censored novel, the Holocaust, alienation, and popular song lyrics.

ENG 1601 Topics in Literature**4 QH**

Same as ENG 1600 but with different topics.

ENG 1602 Major Figure**4 QH**

Examines in detail the work of one writer such as Mark Twain, Virginia Woolf, or Eugene O'Neill.

ENG 1607 Major Figure**4 QH**

Same as ENG 1602, but concentrating on the work of a different writer.

ENG 1608 The City in Literature**4 QH**

Examines the city in literature as it has been depicted from ancient times to the present, from Plato to Barthelme. Discusses such themes as the city as a locus of evil, the city as a place of possibility, and the city as a center of art and an influence on creative form in an interdisciplinary fashion.

ENG 1609 Contemporary American Literature**4 QH**

Studies major movements in American poetry and fiction since 1945. Considers such poets as Plath, Ginsberg, and Ashbery, and such novelists as Morrison, Pynchon, and Vonnegut.

ENG 1610 Early American Literature**4 QH**

Examines American literature of the colonial and federal periods, including Bradford, Taylor, Edwards, Franklin, Wheatley, Irving, and Bryant.

ENG 1611 New England Renaissance**4 QH**

Studies the development of a native tradition in the context of democratic and romantic attitudes toward experience and the paradox these attitudes reveal. Includes such writers as Emerson and Thoreau, Hawthorne, and Melville.

ENG 1612 American Realism**4 QH**

Examines the realistic tradition in American literature, including local color and native humor, from the end of the Civil War to the turn of the century. Includes such writers as Twain, James, Howells, Crane, and Norris.

ENG 1617 Modern American Literature**4 QH**

Studies major developments in American poetry and fiction from 1900 to 1945. Considers such poets as Frost, Eliot, Stevens, and Moore, and such novelists as Hemingway, Faulkner, Fitzgerald, and Porter.

ENG 1618 Children's Literature**4 QH**

Studies the history of children's literature in the English language, with special attention to matters such as genre theory and critical approaches. Includes such works as *Alice in Wonderland*, *Uncle Remus*, *Little Women*, and *The Wizard of Oz*.

ENG 1619 Topics in Children's Literature**4 QH**

Focuses closely either on a specific collection of stories (*Grimm's Fairy Tales*), on a specific genre (boys' books), on a problem of evil, or on children's literature as a form of group socialization.

ENG 1620 Major Early British Novelists 4 QH

Traces the development of the English novel from Defoe to Austen in light of new theories of narrative form, psychology, and "realism."

ENG 1621 Nineteenth-Century British Fiction 4 QH

Studies theme and form in the major English novels of the nineteenth century, considering such authors as the Brontës, Charles Dickens, George Eliot, and Thomas Hardy.

ENG 1622 Major Twentieth-Century British Novelists 4 QH

Introduces students to British fiction from Joseph Conrad to John Fowles, including such writers as D.H. Lawrence, Virginia Woolf, and others less well known. The aim of the course is to show how novels as artistic creations shape their own worlds while helping us to understand ourselves.

ENG 1627 Medieval English Literature 4 QH

Surveys the major works of medieval English literature. Includes works such as *Sir Gawain*, *Piers Plowman*, and *Pearl*.

ENG 1628 Chaucer 4 QH

Surveys the work of Chaucer, with particular emphasis on the *Canterbury Tales*.

ENG 1629 Topics in Chaucer 4 QH

Examines closely a particular work or group of works (such as *Troilus and Criseyde*) or a theme (such as Chaucer's symbolism).

ENG 1630 Milton 4 QH

Concentrates on Milton's *Paradise Lost*, with supplementary readings in his minor poetry and prose.

ENG 1631 Topics in Medieval Literature 4 QH

Focuses on such topics as a genre (romance or debate literature) or on a theme (alchemy or King Arthur).

ENG 1632 Sixteenth-Century Literature 4 QH

Concentrates on sonnets, love lyrics, and erotic narrative poetry, principally by Wyatt, Sidney, Marlowe, Spenser, and Shakespeare.

ENG 1637 Seventeenth-Century English Literature 4 QH

Examines major writers of the period, such as Bacon and Jonson, Donne and Herbert, Milton and Dryden.

ENG 1638 Topics in Seventeenth-Century English Literature 4 QH

Examines closely either a single writer or group of writers (Congreve or the metaphysical poets) or a topic (the flourishing of satire).

ENG 1639 Eighteenth-Century English Literature 4 QH

Surveys the Augustan age of comic masterpieces. Includes such major writers as Pope, Addison, Steele, Swift, Goldsmith, Burns, Johnson, and Boswell.

ENG 1640 Topics in Eighteenth-Century Literature 4 QH

Examines closely such topics as a single writer or group of writers (Fielding or the essayists), a genre (satire), or a theme (reason and madness).

ENG 1641 Romantic Poetry 4 QH

Surveys the development of English Romantic poetry, both in its lyric and longer forms, in Blake, Wordsworth, Coleridge, Byron, Shelley, and Keats. Emphasizes problems of belief and the relationship of the individual to the surrounding world of natural, social, and historical process. (V)

ENG 1642 Topics in Romantic Poetry 4 QH

Examines closely a single writer or group of writers (the Keats-Shelley circle) or a theme (poetry and revolution or the creative process).

ENG 1647 Victorian Literature 4 QH

Surveys the major issues and writers of Victorian England, considering such writers as Tennyson and Browning, Dickens and the Brontës, G.M. Hopkins and Oscar Wilde.

ENG 1648 Topics in Victorian Literature 4 QH

Examines closely a single writer or group of writers (Arnold or the fantasists) or a theme (the movement toward modernism or decadence).

ENG 1649 World Literature 1 4 QH

Surveys world literature from the time of the Greeks through the Renaissance, from Homer to Cervantes.

ENG 1650 World Literature 2 4 QH

Surveys world literature from the Renaissance through the modern period, from Voltaire to Brecht.

ENG 1651 Masterpieces of World Literature 4 QH

Studies "great books," primarily by non-English authors, that have been central to the development of Western thought and culture. Includes such writers as Homer, Dante, Montaigne, Goethe, and Proust.

ENG 1652 Twentieth-Century English Literature 4 QH

Surveys the best and most interesting work of twentieth-century British writers such as William Butler Yeats, D.H. Lawrence, W.H. Auden, Doris Lessing, and Iris Murdoch.

ENG 1657 Topics in Twentieth-Century English Literature 4 QH

Examines closely the work of a single author or group of authors (Lawrence or post-war authors) or a topic (forms of modernism or imperialism).

ENG 1658 Introduction to Shakespeare 4 QH

Covers a selection of the major plays of Shakespeare, including both tragedies and comedies. (III)

ENG 1659 Shakespeare's Comedies 4 QH

Studies the romantic comedies, problem comedies, and romances, ranging from *The Merchant of Venice* to *The Tempest*.

ENG 1660 Shakespeare's Tragedies 4 QH

Studies the nature of the tragic hero, the questioning of social norms, and the landscape of chaos, ranging from *Julius Caesar* to *Coriolanus*.

ENG 1661 Topics in Shakespeare 4 QH

Examines closely such topics as the history plays, Shakespeare in performance, the Shakespearean hero, and psychological approaches to Shakespeare.

ENG 1662 The Bible 4 QH

Studies books of both the Old Testament and the New Testament as literature and as history.

ENG 1667 Modern Poetry 4 QH

Studies the modernist tradition in American and British poetry. Considers such writers as Yeats, Hardy, Frost, Eliot, Stevens, Pound, Williams, and Cummings. (III)

ENG 1668 Topics in Modern Poetry 4 QH

Focuses on a particular theme such as the poet's use of the past, his or her role in politics, a particular problem in modern poetry, or a particular group of modern poets.

ENG 1669 Studies in English Literature 1 4 QH

A seminar on a special topic in English literature, such as color symbolism in literature or John Donne and the metaphysical poets.

ENG 1670 Studies in English Literature 2 4 QH

Same as ENG 1669 but with different topics.

ENG 1671 Studies in American Literature 1 4 QH

Studies a special topic in American literature, such as the genteel tradition or American humor.

ENG 1672 Studies in American Literature 2 4 QH

Same as ENG 1671 but with different topics.

ENG 1677 Contemporary Poetry 4 QH

Studies developments in British and American poetry since 1945. Includes such writers as Plath, Ginsberg, Lowell, Bly, Ashbery, and Heaney. (VI)

ENG 1678 Early African-American Literature 4 QH

Surveys the development and range of black American writers, emphasizing poetry and prose from early colonial times to the Civil War.

ENG 1679 Modern African-American Literature 4 QH

Surveys the development and range of black American writers, emphasizing poetry and prose from the post-Civil War period to the present.

ENG 1690, ENG 1691 Junior/Senior Seminar 4 QH

(First preference given to students needing the course to complete the major.) Explores an important aspect of literature such as the writer and the audience, the tradition of the new, style and meaning, and the jazz age. Emphasizes independent research in a seminar setting.

ENG 1710 Freshman English 1 (Honors) 4 QH

Honors equivalent of ENG 1110.

ENG 1711 Freshman English 2 (Honors) 4 QH

Honors equivalent of ENG 1111.

ENG 1713 Great Themes in Literature (Honors) 4 QH

Honors equivalent of ENG 1113.

ENG 1721 Survey of English Literature 2 (Honors) 4 QH

Honors equivalent of ENG 1121.

ENG 1723 Survey of American Literature 1 (Honors) 4 QH

Honors equivalent of ENG 1123.

ENG 1725 Technical Writing (Honors) 4 QH

Honors equivalent of ENG 1125.

ENG 1750 Intermediate Writing (Honors) 4 QH

Honors equivalent of ENG 1350.

ENG 1758 Introduction to Shakespeare (Honors) 4 QH

Honors equivalent of ENG 1658.

ENG 1781 Writing for Business (Honors) 4 QH

Honors equivalent of ENG 1381.

ENG 1810, ENG 1811 Directed Study 4 QH each

Geology

Please note some courses in the College of Arts and Sciences are duplicated in different departments or colleges, or within a department. You may not receive credit for two such courses. If you have a question about whether one course does overlap with another, please consult the departments involved and the Office of the Dean before taking the course.

Numbers inside parentheses within course descriptions refer to core curriculum categories listed on page 2.

GEO 1119 Marine Resources 4 QH

Provides a qualitative and quantitative survey of renewable and nonrenewable resources from the sea. Aspects covered include offshore oil and gas utilization, marine minerals, tidal power, and coastal zone recreational resources, including polluted beaches and artificial fishing reefs.

GEO 1120 Physical Oceanography 4 QH

Provides a description of the physical properties and composition of sea water, waves, tides, and ocean currents. Discusses how these properties are measured by oceanographers and how they influence the earth's environment and climate.

GEO 1121 Biological Oceanography 4 QH

Topics include the productivity of animal and plant life in the various zones of the ocean and the growing economic importance of the oceans as a source of food for the expanding world population.

GEO 1122 New England Fishery Resources 4 QH

Provides an overview of the fisheries industry of New England. Emphasizes environmental factors controlling the distribution, quality, and abundance of fisheries resources. Discusses the methods and the effects of direct human utilization of the resource as well as the indirect effects of pollution and habitat modification.

GEO 1128 Geological Oceanography 4 QH

Examines the relationship between the form of the ocean basins and their margins and the major processes forming them. Emphasizes local landforms, including New England beaches, spits, barrier islands, and the continental shelf.

GEO 1140 Environmental Geology 4 QH

Discusses how geologic processes acting at the Earth's surface interact with the human environment. Topics include river and ocean flooding, coastal erosion, landslides, land-use planning, and waste disposal.

GEO 1141 Geological Hazards and Resources 4 QH

Discusses how geologic processes originating deep inside the Earth interact with the human environment. Topics include global crystal movements, volcanic and earthquake hazards, mineral resources, coal and oil, geothermal energy, resource management, and disposal of radioactive wastes. (II)

GEO 1154 Planetary Astronomy 4 QH

Focuses on astronomy of the solar system. Topics include description of the planets and other objects, with discussion of how our understanding has evolved from the days of naked-eye observation to the present era of interplanetary probes. (V)

GEO 1208 Age of Dinosaurs 4 QH

Focuses on major physical and biological events of the Mesozoic Era of earth history. Draws on evidence from the sedimentary rock record to provide a basis for interpretations of Mesozoic life, climates, mountain building, and paleogeography. Demonstrates principles of evolution and extinction through dinosaur paleobiology and history.

GEO 1210 North America and the Ice Age 4 QH

Focuses on description and history of ice sheets that have advanced and retreated across the northern United States and Canada during the last three million years. Topics include evidence of past climatic change and predictions of future change, fluctuating sea levels, and the impact of these changes on humans and the environment.

GEO 1212 Physical Geology 4 QH

Offers a systematic study of the materials comprising the Earth. Emphasizes the processes that form, transport, alter, and destroy rock, as well as the nature and development of landscape. (II)

GEO 1213 Physical Geology Laboratory 1 QH

Optional lab for GEO 1212. Exercises pertain to mineral and rock identification and topographic and geologic map interpretation. Required for geology majors. *Prereq.* GEO 1212; *may be taken concurrently.*

GEO 1222 Historical Geology 4 QH

Traces the physical and biological history of the earth through geologic time. Major topics are the origin and evolution of life, mountain building, and continental drift. (II)

GEO 1223 Historical Geology Laboratory 1 QH

Studies fossil representatives of major invertebrate phyla, application of fossils to studies of rock sequences, interpretation of geologic history from geologic maps and sedimentary rocks. *Prereq.* GEO 1222; *may be taken concurrently.*

GEO 1250 Advanced General Geology 4 QH

Offers an introduction to new and advanced concepts, theories, and hypotheses in geology through discussions, research papers, and individual projects. *Prereq.* GEO 1212 and GEO 1222.

GEO 1308 Petrology**5 QH**

The hand specimen and field identification of the common igneous, sedimentary, and metamorphic rocks. Considers the modes of origin and important properties of common rock types. *Prereq.* GEO 1212.

GEO 1310 Descriptive Mineralogy**5 QH**

Provides a study of mineralogy, including crystallography and physical, chemical, and descriptive mineralogy of the common rock-forming minerals. *Prereq.* Two quarters of chemistry.

GEO 1311 Optical Crystallography**5 QH**

Studies the theory and practical methods of optical crystallography, including the basic techniques for determining the optical constants of crystals using the polarizing microscope and immersion media. *Prereq.* GEO 1310.

GEO 1312 Petrography**5 QH**

Topics include description and identification of rocks and rock-forming minerals using thin-sections and the petrographic microscope; discussion of textural and mineralogic relationships. *Prereq.* GEO 1311.

GEO 1320 Field Geology**4 QH**

Focuses on field techniques as a working guide for the approach, pursuit, and solution of geologic problems. Considers such techniques as geologic map construction, stratigraphic section measurement, and field rock description. Lab consists of field research at a quarry, roadcut, or other geologic exposure. *Prereq.* GEO 1212.

GEO 1412 Geochemistry**4 QH**

Offers an evaluation of chemical processes important in the various geologic environments and their effects on the development of the lithosphere. *Prereq.* One year of chemistry.

GEO 1414 Igneous and Metamorphic Petrology**5 QH**

Covers the origin and distribution of igneous and metamorphic rocks as interpreted from their chemistry, mineralogy, and field relationships. Lab includes field and petrographic analysis of rock suites. *Prereq.* GEO 1312.

GEO 1416 Economic Geology**4 QH**

Focuses on the genesis, associations, and occurrence of the major ore minerals, illustrated by studies of selected ore bodies of various types throughout the world. *Prereq.* Department approval.

GEO 1418 Structural Geology**5 QH**

Covers the description and origin of large- and small-scale rock structures with emphasis on interpretation of the mechanics of deformation. Field and lab analyses of structural problems using maps, models, and rock specimens. *Prereq.* GEO 1212 and GEO 1213.

GEO 1420 Geophysics**4 QH**

Studies the basic techniques of reflection and refraction seismology, gravity, aeromagnetic, and heat-flow techniques and the information they provide on the structure, composition, and dynamics of the Earth's

interior. Emphasizes the application of these techniques to the search for economic minerals in the earth's crust. *Prereq.* PHY 1231.

GEO 1424 Stratigraphy**5 QH**

Offers a study of paleoenvironments and sedimentary-basin analysis based on sedimentary structures, stratigraphic sequences, and fossils. Emphasizes use of geologic sections, drill-cores, and well-logs. Includes lab interpretation of sedimentary rock suites, maps, and sections. *Prereq.* GEO 1222.

GEO 1428 Invertebrate Paleontology**5 QH**

Surveys major invertebrate phyla preserved in the fossil record. Discusses micro- and macro-evolutionary principles with consideration of adaptive and functional morphology and the role of paleoenvironments. Lab involves description and classification of fossil invertebrates. *Prereq.* GEO 1222.

GEO 1430 Sedimentation and Sedimentary Environments**5 QH**

Describes the physical processes of sedimentation and their role in the interpretation of modern and ancient sedimentary environments. Lab concentrates on the interpretation and description of the physical and textural properties of sediments and sedimentary rocks.

GEO 1432 Sedimentary Petrology**5 QH**

Topics include origin, classification, and petrography of the major groups of sedimentary rocks. Discusses the environments of deposition of the nonclastic rocks. Lab concentrates on thin-section study of sedimentary rocks. *Prereq.* GEO 1311.

GEO 1435 Coastal Processes**5 QH**

Examines the effect of coastal marine processes and the resultant coastal responses. Topics include the dynamics of waves and currents and the associated erosion, transportation, and deposition of sediment, forming beaches, barrier islands, and cliffed structures. *Prereq.* GEO 1212.

GEO 1436 Marine Geology**4 QH**

Compares the balance between major sedimentary and tectonic forces in ocean basins and margins to resulting ocean form. Topics include origin of continental shelves, shelf sedimentation and transport, deep-sea processes and sediments. Evaluates resource development of OCS oil, sand and gravel, and manganese nodules. *Prereq.* GEO 1212.

GEO 1438 Geology and Land-Use Planning**4 QH**

Studies the causes and solutions of geologic environmental problems related to land use. Topics include the causes and prevention of land-use problems in areas of existing or potential landslides, subsidence, erosion, flooding, and groundwater pollution. *Prereq.* GEO 1140, GEO 1212, or permission of instructor.

GEO 1440 Geomorphology**4 QH**

Focuses on the origin and evolution of landscape features by processes operating at or near the Earth's surface. *Prereq.* GEO 1212.

GEO 1442 Water in Environmental Planning 4 QH

Examines aspects of surface runoff from geomorphic and hydrologic perspectives. Develops methods for description and calculation of major river and drainage basin processes and applies the results to the planning process. Examines human modification of these systems, including urbanization, dams, and channelization, and applies this information to an understanding of regulatory processes. *Prereq.* GEO 1212 or permission of instructor.

GEO 1444 Glacial and Pleistocene Geology 5 QH

Covers the processes of ice movement and the characteristics and distribution of erosional and depositional structures associated with past and present glaciers; introduces Pleistocene chronology and correlations. *Prereq.* GEO 1222.

GEO 1446 Hydrogeology 4 QH

Topics include origin, distribution, and flow of groundwater in permeable sediments and bedrock; hydrological and geological characteristics of aquifers; regional flow systems emphasizing rock structure, stratigraphy, and other aspects of the geological environment; principles of hydrogeology mapping and analysis; and introduction to well design and well hydraulics. *Prereq.* GEO 1212, MTH 1107 or 1123, or permission of instructor.

GEO 1448 Groundwater Geochemistry 4 QH

Important geological processes (formation of soil, some ore deposits, caves, sinkholes) occur when groundwater interacts with rock or soil. In turn, these reactions modify groundwater chemistry and may either improve or worsen water quality. The course investigates these processes as well as groundwater contamination and dispersion, isotope tracer studies, field sampling, and analytical methods. *Prereq.* Two quarters chemistry.

GEO 1450 Geology Seminar 4 QH

Offers in-depth study, on an individual or small-group basis, of a selected geologic topic. Requires both oral and written presentations. *Prereq.* Major in geology or senior status.

GEO 1722 Historical Geology (Honors) 4 QH

Honors equivalent of GEO 1222.

GEO 1754 Planetary Astronomy (Honors) 4 QH

Honors equivalent of GEO 1154.

GEO 1816, GEO 1817 Undergraduate Research 4 QH each

Offers independent research on a selected topic under the direct supervision of a faculty member. *Open only to juniors and seniors majoring in geology, with the recommendation of the supervising faculty member and of the department.*

GEO 1820, GEO 1821 Directed Study 4 QH each

Offers independent study of a specific topic not normally contained in the regular course offerings, but within the area of competence of a faculty member. *Open to all students with the recommendation of a faculty member and departmental approval.*

GEO 1824, GEO 1825 Special Studies 1 QH each

Offers independent study of a specific topic. *Open to all students with the recommendation of a faculty member and departmental approval.*

GEO 1830, GEO 1831, GEO 1832, GEO 1833 4 QH each**Junior/Senior Honors Program**

For details contact the Honors Office, 183 Holmes.

INT 1215 Into the Ocean World 4 QH

This course is a comprehensive interdisciplinary introduction to the oceans. The seas' complexity and the far-reaching consequences of our interactions with them demand an awareness of the many facets of marine study. The teaching team consists of specialists in the sciences, social sciences, humanities, and arts, each with an interest in marine issues and a commitment to bridging the gaps among disciplines. The course themes are as broad as the oceans, but when appropriate, we will focus on Boston harbor, a first step into the ocean world for those of us in this area.

INT 1217 Water Planning for the Future 4 QH

This course is an interdisciplinary introduction to our most precious resource. Water has affected our bodies, our planet, our history, and our culture. How we manage it will shape our future. Because of increasing demand, waste, and pollution, we are depleting—and risk destroying—the limited supply of usable fresh water. Students will look at water through scientific, historical, and cultural viewpoints, and survey contemporary water problems in all their dimensions—political, economic, and technological. (VI)

History

Please note some courses in the College of Arts and Sciences are duplicated in different departments or colleges, or within a department. You may not receive credit for two such courses. If you have a question about whether one course does overlap with another, please consult the departments involved and the Office of the Dean before taking the course.

Numbers inside parentheses within course descriptions refer to core curriculum categories listed on page 2.

HST 1101 Western Civilization to 1648

4 QH

Surveys Western lifestyles, events, institutions, and culture from the earliest human societies through the end of the Thirty Years War. Focuses on Bronze Age civilizations and the origins of universalist religions, Greco-Roman civilization, early Christianity, Islam, the Germanic and Arab successor states to Rome, medieval civilization, the Renaissance and the age of exploration, the Protestant and Catholic reformations, the religious wars that ensued, and the economic transformations that occurred simultaneously. Emphasizes those elements that influenced the development of Western civilization and values. (II) *Not open to students who have completed HST 1121.*

HST 1102 Western Civilization since 1648

4 QH

Surveys the development of Western — largely European — society and values from the rise of the dynastic and bureaucratic states to current Soviet reforms and the integration of the western European economy. Covers royal absolutism, the rise of the scientific world view, the political and economic revolutions that transformed Europe at the end of the eighteenth century, the development of nationalism and Marxism, the race for colonies, the cultural transformations of the early twentieth century, World War I and the Russian Revolution, the crisis of capitalism and the rise of fascism, World War II and the Holocaust, the Cold War and decolonization, and the current state of Western civilization. (II) *Not open to students who have completed HST 1122.*

HST 1121 World Civilization to 1648

4 QH

Surveys the development of human institutions from ancient times through the crisis of the mid-seventeenth century. Emphasizes the continuities and changes that occur within civilization and the similarities, differences, and relationships that exist among contemporary civilizations around the world. Covers such topics as the rise of the world's great religions, the military and trading relationships among the various regions of the ancient and medieval worlds, the economic and technological revival of Europe in the early modern period, and the expanding struggle for resources in the crisis atmosphere of the seventeenth century. *Not open to students who have completed HST 1101 or HST 1701.*

HST 1122 World Civilization since 1648

4 QH

Examines the world from 1648 to the present. Emphasizes the intellectual, technological, and political expansion of Europe and the reactions of the rest of the world. Covers such topics as the global devel-

opment of modern dynastic and bureaucratic states; the expansion of the European economy with its attendant trade wars; imperial expansion and the explosion of the slave trade; the development and reaction of American Indian, Asian, and African civilizations to that imperialism; the sporadic extension and eclipse of colonialism; and the growing tensions between traditional patterns of loyalty and authority and national, regional, and even global systems and cultures as we approach the twenty-first century. *Not open to students who have completed HST 1102 or HST 1702.*

HST 1201 The United States to 1877

4 QH

Focuses on the history of the American people from 1763 to 1877, with an analysis of the American Revolution and the major political, constitutional, diplomatic, economic, and social problems of the new nation. (II)

HST 1202 The United States since 1877

4 QH

Continues the survey of American history, with discussion of the emergence of an industrial economy, an urban society, world responsibility, and expanded federal government. (II)

HST 1241 The Historian's Craft

4 QH

Examines the ways in which the historian studies the past and the nature of historical statements. Problems considered include research techniques, changing conceptions of historical knowledge, and the relation between the historian and the society in which he/she works. (II)

HST 1251 Social Science Methodology

4 QH

Offers an introduction to social science methodology and quantitative techniques used in historical analysis.

HST 1270 Introduction to Public History

4 QH

Explores the field of public or applied history by surveying its components, including historic preservation, oral history, historical editing, historical archeology, genealogy, family history, business history, local history, material culture, historical resource management, museology, historical research for media, archival management, management of nonprofit organizations, and policy history.

HST 1311 Ancient Greece (Group A)

4 QH

Topics include the origins and development of Greek civilization; political evolution of Hellenic society from tribal to city-state organization; and growth and application of Greek religious, political, and ethical ideas. (III)

HST 1315 Ancient Rome (Group A)**4 QH**

Examines Roman civilization in two sequences: the rise of Roman power under the Republic and the decline of Roman power under the Empire.

HST 1321 Medieval Europe (Group A)**4 QH**

Topics include Europe from the barbarian invasions to the late thirteenth century; the expansion of Christianity and the institutionalization of church and papacy; the emergence of the Holy Roman Empire, England, and France as political units; and social, cultural, and economic developments. (III)

HST 1331 Renaissance Civilization (Group A)**4 QH**

Focuses on Europe from 1300 to 1500, when alternatives to medieval institutions became increasingly apparent. Gives special attention to political, economic, and cultural changes in Italy and northern Europe. (III)

HST 1336 Luther and His Age (Group A)**4 QH**

Offers a study of Martin Luther, John Calvin, Henry VIII, Elizabeth I, and their political and religious contemporaries who between 1500 and 1650 overthrew the church's monopoly of religion, forged new relationships between princes and subjects, found new ways to create wealth, challenged the traditional roles of men and women in families and communities, and created new attitudes toward national and international politics.

HST 1351 England to 1688 (Group A)**4 QH**

Studies prehistoric Britain, the Anglo-Saxons, the Normans, the Plantagenets, the Tudors, and the Stuarts, with emphasis on the development of parliamentary institutions until the Glorious Revolution.

HST 1355 Tudor England (Group A)**4 QH**

Provides a study of England from the late fifteenth to the early seventeenth century. Topics include an examination of the Tudor contribution to the development of political and social institutions; the Protestant Reformation and the relation between religion and politics; social and economic changes and their relation to the Elizabethan Renaissance. Particular emphasis is placed on intellectual and cultural developments and England's relation to Europe and the New World.

HST 1358 Stuart England (Group A)**4 QH**

Studies seventeenth-century England, from the reign of James I. Topics include the social, economic, and political backgrounds of the English Civil Wars or Puritan Revolution; the age of Cromwell; the restoration of the Stuarts; the Glorious Revolution; and the end of the Stuart dynasty. Uses

seventeenth-century sources and literature in addition to modern texts.

HST 1390 Population in European History (Group A or B)**4 QH**

This course is based on the field of population studies and is concerned primarily with examining the causes and consequences of changes in human birth, death, marriage, and migration rates from the Old Stone Age to the late twentieth century. The interaction and impact of climate change, epidemic disease, war, economic development, and political policy, as well as changes in the structure and function of human family and child-rearing systems will be examined. (III)

HST 1392 Women in Preindustrial Europe (Group A or B)**4 QH**

Examines changing sex roles from the early Christian era through the eighteenth century and assesses their significance within the social and political context of pre-industrial Europe. Topics include society's attitudes toward the sexes, family structure and marriage patterns, and male and female roles in economic life and in religious and political movements.

HST 1393 History of Science and Technology (Group A or B)**4 QH**

Offers an interdisciplinary survey of the development of science and technology, integrating theories of the philosophy and sociology of science within a historical framework. Emphasizes the environmental and ideological conditions that contribute to the birth and growth of the various sciences and to the relation between these conditions and technological innovation.

HST 1395 History of Flight and Space Travel (Group A, B, or C)**4 QH**

Beginning with the dreams of flight of the ancient Greeks and Leonardo da Vinci, the course traces the history of nonpowered flight from the balloon experiments of the Montgolfier brothers to contemporary hang gliders; powered flight from the Wright brothers to the SST; and rocketry and space travel from its earliest beginnings to "Enterprise."

HST 1397 Health and Sickness: Historical Perspectives (Group A, B, C, or D)**4 QH**

Surveys medical theories and the health care systems derived from them, from ancient times to the present. Medical theory and practice as related both to the general history of the time and to the particular political, economic, or social circumstances that influenced institutions for health care.

HST 1407 Europe, 1870–1921 (Group B)**4 QH**

Focuses on Europe from the Franco-Prussian War to the post-World War I settlement: the growing tensions and rivalries and the declining certainties of the end of the nineteenth century, the origins of World War I, the war itself, the Russian Revolution, and the Peace of Paris.

HST 1408 Europe since 1921 (Group B)**4 QH**

Focuses on Europe from the Versailles Settlement: the rise of totalitarianism, the Depression, the crises of liberalism and of the European mind, the Appeasement Era, World War II, the Cold War, the end of colonialism, and Europe today.

HST 1421 England since 1688 (Group B)**4 QH**

Focuses on England from the Glorious Revolution to the present, with emphasis on the development of Parliament, the Industrial Revolution, nineteenth-century reaction and reform, the world wars, and the rise of socialism.

HST 1424 Victorian England (Group B)**4 QH**

Discusses the economic, social, and political life of the English people during Victoria's reign. (IV)

HST 1425 The Decline of Great Britain (Group B)**4 QH**

Discusses the economic, social, and political life of the English people in the twentieth century. (IV)

HST 1428 Irish Civilization (Group B)**4 QH**

Examines the history of Irish civilization from the earliest hero sagas and their impact on Irish values to the Irish independence movement, the prototype for many other twentieth-century liberation movements. (IV)

HST 1429 Introduction to Irish Studies (Group B)**4 QH**

Presents Irish studies in one-week sequences from the perspective of a number of fields: art, business, drama, history, literature, music, politics, and sociology. Introduces students to the important forces that have helped to shape contemporary Ireland and Irish-American culture. Same as INT 1252. (IV)

HST 1433 The French Revolution and Napoleon (Group B)**4 QH**

Examines the history of France in the age of the *ancien regime* and the Enlightenment as background for the French Revolution and Napoleon.

HST 1434 Modern France (Group B)**4 QH**

Surveys the chief political, social, economic, intellectual, and cultural developments of France from the Revolution to the present. (IV)

HST 1435 History of Modern Italy (Group B)**4 QH**

Offers a survey of the social, economic, and political development of the modern Italian state from the

seventeenth century to the present. Emphasizes the problem of modernization.

HST 1441 Hitler's Germany (Group B)**4 QH**

Offers a study of the origins and nature of Hitler's Third Reich, emphasizing the personal lives of Nazi leaders in an attempt to understand how seemingly ordinary people could enthusiastically promote wars of aggression and revel in genocidal policies.

HST 1451 Imperial Russia (Group B)**4 QH**

Focuses on the emergence of Russia as a recognized European power, westernization and expansion in the eighteenth century, the impact of Napoleon, and reform and revolution.

HST 1452 Soviet Russia (Group B)**4 QH**

Examines forces molding the history of Russia since 1917, including both internal developments and foreign relations. (IV)

HST 1471 Class, Love, and Power in Western Europe (Group B)**4 QH**

Provides an examination of social change in Europe since 1800 with emphasis on the interaction of industrialization, class movements, demographic trends, and revolutionary upheavals.

HST 1472 The Family in European History (Group B)**4 QH**

Examines issues in the history of the European family from the late Middle Ages to the present. Topics include marriage and sexuality, child-rearing practices, the effect of industrialization and revolution on family life, the Victorian family, and the evolution of the modern family. Students will prepare their own family histories.

HST 1473 Women in Modern Europe (Group B)**4 QH**

Examines the situation of women in Western Europe from the French Revolution to the 1950s, focusing on France, Britain, and Germany. Topics explored include women in revolutionary movements, the impact of industrialization on women and the family, women in the labor movements, the struggle for suffrage, and the effects of world wars on women.

HST 1481 The Culture of Europe (Group B)**4 QH**

Provides an analysis of the culture of the West in the nineteenth and twentieth centuries, focusing on the conjunction of social, cultural, and psychological forces that encouraged or retarded creativity. Considers the interconnections among the arts, social sciences, and sciences within each of the periods covered. (III)

HST 1485 Communism and Revolution (Group B)**4 QH**

Focuses on the history of socialism and revolution from the early nineteenth-century utopias to the New Left of the 1960s.

HST 1490 Introduction to Women's Studies: Image, Myth, and Reality (Group B or C) 4 QH

Introduces the issues and methodology involved in the interdisciplinary study of women. Encompasses the historical, political, economic, and social processes that have created both the image and the reality of women in society. Uses guest lecturers to provide an overview of the many disciplinary approaches to the study of women. This course is required for women's studies minors and can be used as a general elective or, depending on the discipline of the coordinator, to satisfy specific concentration requirements. Same as INT 1150. (II)

HST 1491 Modern Western Economic History (Group B or C) 4 QH

Surveys the development of the Western world within the framework of economic theory, with attention to social and political ramifications. (III)

HST 1493 Work and Leisure (Group B or C) 4 QH

How we work and how we play are important determinants of how we live. This course examines the historical evolution of contemporary patterns of work and leisure across cultural, sexual, and class lines. Subjects include the impact of machine technology on the worker and the workplace, workers' organizing in unions and professional groups, changing concepts of the use of time, women's work and women's leisure; recreation and sports (both participant and spectator); and the rise of the cafe and the saloon as sociable institutions. (III)

HST 1494 History and Film (Group B or C) 4 QH

Explores various historical issues as seen through the eyes of historians and filmmakers. Presents both acted and documentary films in combination with readings from a variety of source and interpretive materials.

HST 1495 Technological Transformations of Society (Groups B, C, or D) 4 QH

Examines the relation between technological innovations and the world in which they take place. Discusses conditions necessary for discovery and innovation and the impact of technology on political, economic, and social environments.

HST 1496 War in the Twentieth Century (Group B, C, or D) 4 QH

Provides an analysis of the causes, prosecutions, and effects of the major wars fought in the twentieth century, concentrating on the First and Second World Wars and on the Vietnam War. Using film, simulations, and other materials, classes explore the economic, social, cultural, and psychological impacts of these wars as well as their political, diplomatic, and material aspects.

HST 1497 The World since 1945 (Group B, C, or D) 4 QH

Offers a thematic study of issues and movements that have influenced the world's history since the end of

the Second World War. Subjects include the Cold War, the end of colonialism, urbanization, technology and ecology, cultures and counter-cultures, the "global village," and the prospects for human liberation.

HST 1501 Topics in American History (Group C) 4 QH

Covers special topics in the history of the people of the United States from 1789 to the present.

HST 1510 Colonial America (Group C) 4 QH

Covers the discovery and exploration of the New World, the settlement of the English colonies on the North American mainland, their development to 1763, and the origin of their clash with England. (III)

HST 1511 The American Revolution (Group C) 4 QH

Focuses on the coming of the American Revolution, its nature and progress, and its political, economic, and social aftermath.

HST 1514 The Civil War and Reconstruction (Group C) 4 QH

Focuses on the Civil War, its coming, its nature and progress, and the aftermath of Reconstruction.

HST 1516 The United States, 1898–1939 (Group C) 4 QH

Examines social, economic, political, and diplomatic changes from the Progressive Era through the Great Depression and the New Deal.

HST 1517 The United States, 1939–1960 (Group C) 4 QH

Examines social, economic, political, and diplomatic changes from the start of World War II to the election of John F. Kennedy.

HST 1518 The United States since 1960 (Group C) 4 QH

Examines social, economic, political, and diplomatic changes in the United States since 1960.

HST 1525 African-American History (Group C) 4 QH

Provides an in-depth examination of the major topics that have shaped the African-American experience. Topics included are slavery and its effects, the role of the antebellum free black, the Civil War and Reconstruction, black response to the new racism of the late nineteenth century, the W.E.B. DuBois–Booker T. Washington controversy, Marcus Garvey and the shaping of twentieth-century black nationalism, and the changing nature of the black revolution from Martin Luther King, Jr., to Malcolm X and beyond. Same as AFR 1131. (III)

HST 1526 African-American History since 1900 (Group C) 4 QH

Examines the rising tide of African-American nationalism during the twentieth century, with special emphasis on the founding of the NAACP, the Garvey movement, the Harlem Renaissance, the founding of the Black Muslims, A. Philip Randolph's March on Washington movement, the rise of Martin Luther King, Jr., and the demand for change epitomized by the concept of Black Power. Same as AFR 1132.

HST 1533 History of Boston (Group C) 4 QH

Explores the history of Boston from colonial times to the present, with attention to the topographical growth and the ethnic composition of the city.

HST 1539 American Jewish History (Group C) 4 QH

Examines Jewish political, social, and cultural history from the arrival of the first group of Jews at New Amsterdam in 1654 to the present. Themes covered include immigration, assimilation, family life, religion, anti-Semitism, Zionism, the Holocaust, and American-Israeli relations.

HST 1543 American Urban History (Group C) 4 QH

Examines the development of urban society in the United States in the nineteenth and twentieth centuries, with emphasis on the effects of immigration and industrialization upon the politics, thought, and society of American cities.

HST 1544 Environmental History of the United States (Group C) 4 QH

Examines American attitudes and practices toward natural and artificial environments from the first exploration to the present, paying special attention to literature, art, and landscape design.

HST 1552 American Reformers and Reform Movements (Group C) 4 QH

Provides an analysis of American reform, especially in the nineteenth century.

HST 1553 The Family in American History (Group C) 4 QH

Explores the history of the family, including the African-American family, in pre-modern and modern American society. Focuses on the traditional and modern roles of parents and children. Investigates patterns of sexuality, marriage, childrearing, work, play, death, and dying. Compares various family types, including elites, middle class, and indigent. Evaluates external forces affecting family structure and life, such as geographical mobility, industrialization, and warfare.

HST 1554 Women in America (Group C) 4 QH

Offers an analysis of women's economic and social roles from the colonial period to the present, with special attention to women's work, their roles in family and community, and nineteenth- and twentieth-century women's rights movements. (III)

HST 1555 American Elites (Group C) 4 QH

Examines the life of elite individuals and groups in American society, especially in the nineteenth and twentieth centuries.

HST 1563 History of Sport in America (Group C) 4 QH

Provides a history of the major sports and their impact on American life.

HST 1571 American Business History (Group C) 4 QH

Examines the rise of business in America, the role of the corporation, horizontal and vertical combinations, business and labor, and business and government.

HST 1575 History of Media in America (Group C) 4 QH

Focuses on mass communication in American history, with attention to the role of books, newspapers, magazines, films, radio, and television.

HST 1577 America and the Sea (Group C) 4 QH

Topics include the history of exploration and discovery of America, the development of fishing, the rise of ocean commerce, and the history of the American Navy.

HST 1578 The Automobile in America (Group C) 4 QH

Focuses on the impact of the automobile on American society in a historical context. Topics include the abandonment of traditional prohibitions of motorized carriages; the use of planning, taxes, and highway policies to foster the use of the automobile; the effect of the car on land use, recreation, and the economy; and contemporary issues such as pollution and energy.

HST 1581 The Growth of American Government to 1935 (Group C) 4 QH

Examines the expansion of government from the late nineteenth century to the Great Depression of the 1930s, focusing on the growth of the federal government, the presidency from Cleveland to Roosevelt, and new public policies.

HST 1582 The Growth of American Government Since 1935 (Group C) 4 QH

Examines the expansion of government from Roosevelt to the present, focusing on the reasons for the growth and its consequences, the development of major public policies, and the transformation of the federal role and politics.

HST 1585 American Diplomatic History (Group C) 4 QH

Focuses on the formation and administration of American foreign policy from the Revolution to the present.

HST 1586 American Military History (Group C) 4 QH

Surveys the complex relationship between American society and war, from the age of muskets to the neutron bomb.

HST 1591 China and the United States (Group C or D) 4 QH

Examines the relations between China and the United States, including the period of the missionaries and opium traders; the era of special privileges; the Open Door policy; the first half of the twentieth century, when China became America's favorite protégé; and the years of strain, warfare, and finally accommodation after the Chinese communists came to power in 1949.

HST 1592 History of the Vietnam War (Group C or D) 4 QH

Presents a history of military conflict in Vietnam with attention to the rise of the Viet Minh during World War II, the struggle against the French in the first Indochina war, the impact of the Cold War, and the involvement of the United States after 1950 in Laos and Cambodia as well as Vietnam. Emphasizes the roles of communism and nationalism in Indochina and the motives for American intervention. Films revealing American reaction to the escalating conflict will be shown.

HST 1604 Modern Latin America (Group D) 4 QH
 Surveys Latin America from the mid-nineteenth century to the present. Topics include dictatorial republics and the continuation of poverty and injustice, the struggles toward democracy, the rise of nationalism, the threat of communism, and the relations between the United States and Latin America.

HST 1605 The Modern Caribbean (Group D) 4 QH
 Topics include the successful Haitian revolt against slavery, peasant movements after the abolition of slavery, the Marcus Garvey movement, Caribbean music and art, the Cuban revolution, Black Power, and American interventions in the Caribbean from the Spanish-American War to Grenada. This course is the same as AFR 1297.

HST 1612 The Modern Middle East (Group D) 4 QH
 Focuses on the Middle East since 1800, with emphasis on the background of present problems. (VI)

HST 1613 Contemporary Middle East (Group D) 4 QH
 Focuses on political, economic, and social developments in the Middle East since World War II.

HST 1614 The Middle East Today in Fact, Fiction, and Film (Group D) 4 QH

Presents a study of social, economic, and political changes and conflict in the lives of ordinary people who have been experiencing the recent crises reported in the media. Focuses on common experiences among various peoples—Turks, Armenians, Israelis, Arabs, and Iranians—and emphasizes significant themes: lifestyles, generational conflict, the changing role of women, ethnic or ideological conflict, and the prevalence of identity crises attending cultural and social disruption.

HST 1620 Early African Civilization (Group D) 4 QH
 Studies the ancient empires of Africa, especially Chana, Songhai, Mali, Zimbabwe, the city-states of East Africa, and the Congo Kingdom. Includes Ethiopian and Egyptian history and controversies to 1800. Same as AFR 1191.

HST 1621 Modern African Civilization (Group D) 4 QH
 Provides an introduction to modern Africa in the years from 1800 to 1960, showing how a new African civilization arose out of the conflict-ridden conditions imposed on the old. Themes include economic, social, political, religious, and artistic life, as well as the influences of slavery, colonialism, and nationalism. Same as AFR 1197. (IV)

HST 1623 West African History (Group D) 4 QH
 Surveys the politics and economics of West Africa from the rise of the Mali Empire to the contemporary problems of national development for the countries from Senegal to Nigeria. Same as AFR 1403.

HST 1624 East African History (Group D) 4 QH
 Covers the peoples and cultures of precolonial East Africa, their contacts with each other and the outside world, the impact of British and German colonial rule, the Mau Mau revolt and the struggle for independence, and the colonial heritage in contemporary East Africa. Same as AFR 1401.

HST 1625 South African History (Group D) 4 QH
 Presents the historical background to current conflict in the Republic of South Africa and in adjoining Mozambique, Zimbabwe, and Namibia. Examines the rise of the apartheid system—and the opposition and alternatives to it—through the themes of racial conflict, nationalism, and industrialization in this African setting. Same as AFR 1405. (VI)

HST 1633 Modern China (Group D) 4 QH
 Explores the far-reaching political, economic, and social changes in China from 1800 to the present. Examines the decline of the empire, the impact of the West, the rise of nationalism, industrialization, the changing role of women, the origins of rural revolution, and establishing the Communist state.

HST 1634 Contemporary China (Group D) 4 QH
 Examines Chinese polity, society, and economy from 1949 to the present, including the restructuring of urban and rural society in the 1950s, the rise of a new class, the emergence of factionalism, the Cultural Revolution, and the impact of the post-Mao economic and political reforms.

HST 1637 Modern Japan (Group D) 4 QH
 Surveys the evolution of Japan from a third-world nation to a superpower. Major themes include the breakdown of feudalism, the impact of the West, the Meiji Restoration, industrialization, militarism, and Japan's post-World War II modern economic miracle.

HST 1641 Recent Leaders of Asia (Group D) 4 QH
 Uses biographies and films to illustrate the lives of Gandhi of India, Ho Ch'i-minh of Vietnam, Mao Zetong of China, and other Asian leaders and the role they played in influencing the revolt against their foreign colonizers. Major themes include the systems of foreign imperialism and the opposition of Asian nationalism.

HST 1644 Third World Women (Group D) 4 QH
 Explores the role of women in the less-developed third world areas, with special emphasis on factors of change, development, and continuity. (IV)

HST 1652 Islam Resurgent (Group D) 4 QH
 Analyzes what has been called "the militant revival of Islam" as a rallying point for reformist or revolutionary movements in the Muslim world. Includes little-known Muslim areas outside the Middle East in Africa and Asia. (VI)

HST 1701 Western Civilization (Honors) 4 QH
 Honors equivalent of HST 1101.

HST 1702 Western Civilization 2 (Honors) 4 QH
 Honors equivalent of HST 1102.

HST 1711 America to 1877 (Honors) 4 QH
 Honors equivalent of HST 1201.

HST 1712 America since 1877 (Honors) 4 QH
 Honors equivalent of HST 1202.

HST 1801 Directed Study 4 QH

HST 1805 Approaches to History 4 QH
 Students will undertake a major historical project based on the application of appropriate methodolo-

gies and upon the substantive understanding of a single subject chosen by the course instructor and announced in advance of the quarter. The course is rotated among the department's faculty. All history majors are required to take this course, though it is open to all upperclass students. All students must have completed 80 quarter-hours of work before taking this course.

HST 1811, HST 1812, HST 1813 4 QH each
Junior/Senior Honors Program

For details contact the Honors Office, 183 Holmes.

HST 1821 Fieldwork in History I 4 QH
 Offers directed work in historical societies, archives, museums, and other historical agencies. Students should consult the Department of History for details.
Prereq. HST 1101, HST 1102, HST 1201, HST 1202, and 16 QH in other history courses.

HST 1822 Fieldwork in History 2 4 QH
 Offers directed work in historical societies, archives, museums, and other historical agencies. Students should consult the Department of History for details.
Prereq. HST 1821.

INT 1150 Introduction to Women's Studies: Image, Myth, and Reality 4 QH
 Provides an introduction to the study of women in society. Encompasses the historical, political, eco-

nomie, and social processes that have created both the image and reality of women in contemporary society and offers an overview of the many different disciplinary approaches to the study of women. Same as HST 1490. (II)

INT 1216 A History of Seafaring 4 QH
 This course surveys maritime transportation, trade, travel, exploration, and warfare from approximately 3500 B.C. to the end of the wooden boat era in the late nineteenth century. Prior to the widespread application of steam power on land and sea in the nineteenth century, ships were the fastest, safest, and most economical means of transporting large cargoes over long distances. Literary and art history sources are also introduced, along with several films on maritime archaeology.

INT 1252 Introduction to Irish Studies 4 QH
 Examines Ireland and Irish-America from the perspective of a number of fields in one-week sequences: art, business, drama, history, literature, music, politics, and sociology. Introduces students to the important forces that have helped to shape contemporary Ireland and Irish-American culture.

Interdisciplinary Courses

Numbers inside parentheses within course descriptions refer to core curriculum categories listed on page 2.

INT 1110 American Musical Theatre 4 QH
 Offered by the Department of Drama and Music. Traces the development of the American musical from works such as *The Black Crook* to the present. Considers the role of musical theatre as both entertainment and serious art form through an examination of script, score, dance, and design. Includes works by composers and lyricists such as Bernstein, Rodgers and Hammerstein, the Gershwins, Weill, Lerner and Loewe, and Cole Porter.

INT 1150 Introduction to Women's Studies: Image, Myth, and Reality 4 QH
 This is an introductory survey of the issues and methodology involved in the interdisciplinary study of women. Such a survey encompasses the historical, political, economic, and social processes that have created both the image and the reality of women in society. Guest lecturers provide an overview of the many different disciplinary approaches to the study of women. This course is required for women's studies minors and may be used as either a general elective or, depending upon the discipline of the coordinator, to satisfy specific concentration requirements. (II)

INT 1151, INT 1152 Women's Studies: Seminars in Research 4 QH
 These interdisciplinary women's studies seminars allow students to address problems in depth by

researching a topic of particular interest. Careful development of a research plan is encouraged, and opportunities are provided for sharing work in progress and for exchanging findings. These findings involve little in-class time, but much consultation with appropriate faculty. The final product of seminar work and research is a major paper. Students in the Honors Program may substitute one quarter of honors registration for each seminar, but are still expected to attend the formal sessions of the seminar. These seminars are required for women's studies minors.

INT 1165 Special Topics in Sport and Society 4 QH
 Designed to augment a variety of courses offered in the area of sports studies. Content varies depending on the resources and staff available; previous offerings have examined the relationships between sports and the law and sports and business.

INT 1201 An Analysis of American Racism 4 QH
 This seminar in contemporary aspects of racism in America discusses the cycle by which racism in our institutions helps form our attitudes and the manner in which our attitudes, in turn, shape our institutions. Emphasizes the practical, day-to-day aspects of racism, rather than the theoretical and historical.

INT 1215 Into the Ocean World 4 QH
 This course is a comprehensive interdisciplinary introduction to the oceans. The seas' complexity and

the far-reaching consequences of our interactions with them demand an awareness of the many facets of marine study. The teaching team consists of specialists in the sciences, social sciences, humanities, and arts, each with an interest in marine issues and a commitment to bridging the gaps among disciplines. The course themes are as broad as the oceans, but, when appropriate, we focus on Boston harbor, a first step into the ocean world for those of us in this area.

INT 1216 A History of Seafaring 4 QH

This course surveys maritime transportation, trade, travel, exploration, and warfare from approximately 3500 B.C. to the end of the wooden boat era in the late nineteenth century. Prior to the widespread application of steam power on land and sea in the nineteenth century, ships were the fastest, safest, and most economical means of transporting large cargoes over long distances. Literary and art history sources are also introduced, along with several films on maritime archaeology.

INT 1217 Water: Planning for the Future 4 QH

This course is an interdisciplinary introduction to our most precious resource. Water has affected our bodies, our planet, our history, and our culture. How we manage it will shape our future. Because of increasing demand, waste, and pollution, we are depleting—and risk destroying—the limited supply of usable fresh water. This course will look at water through scientific, historical, and cultural viewpoints, and survey contemporary water problems in all their dimensions—political, economic, and technological. (VI)

INT 1252 Introduction to Irish Studies 4 QH

Presents Irish studies in one-week sequences from the perspective of a number of fields: art, business, drama, history, literature, music, politics, and sociology. Introduces students to the important forces that have helped to shape contemporary Ireland and Irish-American culture.

INT 1320 Exploring the Humanities Through Film 4 QH

Investigates the ways in which the methods of the humanities can expand one's awareness of the sources, statements, and meanings of popular films. Presents series of movies for evaluation in the light of readings, the various approaches presented by faculty members from a number of humanistic disciplines, and students' own experience. (II)

INT 1321 Modernism: Art, Film, and Literature 4 QH

Examines the interrelation of film, art, and literature in the major movements of the twentieth century to 1939. Studies Futurism, Cubism, Expressionism, Dadaism, and Surrealism, featuring European films, art, and literature in a comparatist perspective. Examines the persistence of modernist elements in contemporary art, literature, and film. Research paper or creative project due at the end of the term. Team-taught by members of the art, English, and modern languages departments.

INT 1330, INT 1331 Field Experience in Human Services 1 and 2 4 QH each

Human services students are required to fulfill two fieldwork placements during the last two years of their program. Each placement consists of 150 hours on-site and generally varies according to the students' interest. Examples of placement sites include community centers, nursing homes, vocational workshops, state and federal agencies for children, and recreational facilities. Experiences are supervised by University staff to maximize the students' learning opportunities. *Junior or senior status, by permission only.*

INT 1333 Senior Seminar in Human Services 4 QH

Designed for seniors in human services, the course examines emerging roles and career options within the human services field. Study will focus on self-examination of attitudes and values affecting delivery of services, exploration of ethical issues and dilemmas relevant to human services, grantsmanship and funding issues, staff supervision and development within human services agencies, and refinement of group leadership skills.

INT 1340 Cultural Aspects of International Business 4 QH

Using a managerial perspective, this course covers issues that arise when a firm moves from its home country to a host country that may have a different national culture. Although it will usually assume the perspective of the United States-based firm that operates abroad, it will spend some time on what happens to other national firms operating in the United States and in third-country environments. The way in which "corporate culture" evolves, in the context of national culture and the impact on managers, will be a central issue. *Prereq. Middler standing.*

INT 1400 Professional Practices: Individual and Social Dimensions 4 QH

Explores the dimensions and dilemmas of freedom and responsibility confronting professional people practicing within limits set by socioeconomic conditions, by clients, and by other professionals. Examines case histories to illustrate the dilemmas professionals face, choices typically made, and the consequences these have on the freedom of the practitioner and on personal and professional integrity.

INT 1401 Health Professionals: Past, Present, and Future 4 QH

Focuses on social history of the modern health professions. Explores long-range patterns in the organization and regulation of the health professions, beginning with the Middle Ages and emphasizing the Jacksonian period, industrialization, modern professional organizations, the growing role of the state, responses of the health professions, and the future of health care in the United States under various corporate/government schemes for reorganization and "accountability."

INT 1580 Physical Chemistry with Biological Applications 4 QH

Examines physiochemical principles as they apply to biological processes. Topics include chemical equi-

libria, reaction kinetics, basic thermodynamics, oxidation-reduction reactions and bioenergetics, and transport. Emphasizes problem solving as a tool for learning, using a quantitative approach. Explains basic assumptions and limitations underlying principles; for the most part, however, rigorous derivations are avoided. Makes applications to basic experimental techniques in biochemistry by way of relevant biochemical examples. *Prereq.* BIO 1261.

INT 1700 War and Conflict in the Nuclear Age (Honors) 4 QH

Honors equivalent of INT 1140. Discusses the development of nuclear weapons. Explores the decisions leading to and the aftermath of the nuclear attack on Hiroshima and Nagasaki. Examines the Cold War and the growth of nuclear arsenals, the potential causes of a nuclear war and the probable effects, and this issue's moral questions. Evaluates strategies for preventing nuclear war.

INT 1702 War Work: The Experience of World War II (Honors) 4 QH

Examines the Second World War as an example of the impact external events can have on professions. This upperclass course is team-taught by faculty from various disciplines.

INT 1703 Environmental Policy (Honors) 4 QH

Evaluates law, policy, and scientific decision making in resolving environmental resource conflicts and in dealing with the health risks of new technologies. Introduces regulatory approaches including the Clean Water Act, wetlands protection, and toxic torts litigation.

INT 1704 Northeastern in the 1960s (Honors) 4 QH

Explores how college life and curricula have changed over the past twenty years by studying the microcosm of Northeastern University. Involves research papers on topics such as curriculum changes, student values as reflected in literature and folklore, and the Northeastern riots in comparative context.

INT 1705 Greek Language and Literature (Honors) 4 QH

Focuses on Attic Greek grammar and selections from Greek literature in the original language. Discussion of texts is major part of course.

INT 1706 Industrial Relations (Honors) 4 QH

Presents theories and applications of labor management relations through lectures and case discussions. Focuses on the development of American and European labor movements, emphasizing legal and economic factors. Topics include union objectives, organization, and structure; union government and democracy; collective bargaining; and management approaches to industrial relations.

INT 1707 Psychoanalytic Literature (Honors) 4 QH

Examines literature from a psychoanalytic perspective. Topics include Freud's theories, object relations, Lacan's theories, and Kohut's self-psychology. Discusses works by Charles Dickens, Franz Kafka, Virginia Woolf, Doris Lessing, and Anne Tyler.

INT 1721 Modernism: Art, Film, and Literature (Honors) 4 QH

Honors equivalent of INT 1321.

Journalism

Please note that some courses in the College of Arts and Sciences are duplicated in different departments or colleges, or within a department. You may not receive credit for two such courses. If you have a question about whether one course does overlap with another, please consult the departments involved and the Office of the Dean before taking the course.

Numbers inside parentheses within course descriptions refer to core curriculum categories listed on page 2.

JRN 1103 Newswriting I 4 QH

Covers functions of the editorial department and procedures in obtaining and writing news stories. Offers extensive news writing and an introduction to interviewing. Legal issues defined. Typing skills required. *Prereq.* ENG 1275 with grade of C or better.

JRN 1104 Newswriting 2 4 QH

Offers practice in multi-source and breaking stories. Provides an introduction to government and court reporting, advanced work in interviewing, and experience in writing under deadline pressure. Discusses legal issues. *Prereq.* JRN 1103 with grade of C or better.

JRN 1206 Editing 4 QH

Provides practice in copy editing and headline writing. Presents assignments in photo selection, crop-

ping, and outline writing. Introduces page layout. *Prereq.* JRN 1104 with grade of C or better.

JRN 1250 Interpreting the Day's News 4 QH

Considers the news of the day and the function of the newspaper, news magazine, and news broadcasts in American life. Topics include rights and responsibilities of the press and how news is gathered, processed, and disseminated by the various media. (VI) *For nonmajors as well as majors.*

JRN 1301 Basic Photojournalism 4 QH

Covers camera and darkroom procedures along with cropping, assignment techniques, theory, and photo caption methods. *Prereq.* JRN 1104.

JRN 1305 Techniques of Journalism 4 QH

Provides practice in writing in-depth and multiple-source stories requiring significant research. Provides an introduction to investigative reporting,

practice in feature writing, and a review of legal issues. *Prereq.* JRN 1104.

JRN 1320 Radio News Gathering and Reporting 4 QH
Covers writing and editing news for radio, with practice in interviewing, organizing news scripts, and integrating audio materials into broadcast. *Prereq.* JRN 1103.

JRN 1336 Public Relations Principles 4 QH
Presents the principles, history, and methods of public relations, processes of influencing public opinion, responsibilities of the public relations practitioner, and analyses of public relations programs. *Prereq.* *Sophomore standing.*

JRN 1350 Advertising Principles 4 QH
Covers the development, procedures, economic functions, and responsibilities of advertising: planning, research, production, and other elements that go into successful advertising. *Prereq.* *Sophomore standing.*

JRN 1421 Television Newswriting 4 QH
Covers writing for TV news as opposed to other news media, importance of the writer-reporter as field-producer and writer-producer, and terms and language used in the production of TV news shows. Includes actual individual production of news shows, field trips to TV stations, and guest lecturers from the TV news media. *Prereq.* JRN 1103.

JRN 1422 Television News Production 4 QH
Demonstrates techniques used by the electronic journalist and TV news producer. Provides the opportunity to build a TV news show and to do reporting with portable TV cameras and editing equipment. *Prereq.* JRN 1103 and JRN 1421, or permission of instructor.

JRN 1428 The Role of Journalism in Sports 4 QH
Offers an analysis of the impact of journalism on the institution of sports in this country and around the world. Considers sports reporting as a motivator and demotivator from Little League to college and professional levels. Looks at the effect of news media coverage on violence in organized sports, on America's physical fitness, and on other aspects of society.

JRN 1430 Fundamentals of Sports Reporting 4 QH
Applies principles of news reporting to covering men's and women's sports for print and broadcast media. Emphasizes using sports reference materials, developing contacts, interviewing, and structuring the sports story. Also discusses investigative reporting in sports. *Prereq.* JRN 1104.

JRN 1432 Local Government Reporting 4 QH
Discusses coverage of town/city government, with emphasis on the "beat" approach to reporting public affairs. Focuses on practical, in-the-field experience with town meetings, meetings of boards of selectmen, and other commissions and bodies transacting public business. *Prereq.* JRN 1104.

JRN 1440 Design and Graphics 4 QH
Applies layout and design principles to newspapers, magazines and other print media. Covers type faces,

copy measuring, dummyming, photo sizing, and keeping copy flow charts. Applies design and graphics principles to advertising layout. *Prereq.* JRN 1206.

JRN 1451 Advertising Copy Writing 4 QH
Covers theory and techniques of creating advertising copy for newspapers, magazines, radio, television, and direct mail. Emphasizes fact gathering, copy structure, and advertising design. *Prereq.* JRN 1103, and JRN 1350.

JRN 1460 Public Relations Problems 4 QH
Applies public relations techniques to actual problems; presents case studies in industry, labor, education, government, social welfare, and trade associations. *Prereq.* JRN 1336.

JRN 1501 History of Journalism 4 QH
Traces the development of American journalism from its European and English beginnings. Topics include the colonial press, the great personal journalists of the nineteenth century, and the impact of major technological changes in mass communications media in the twentieth century. Some writing required. *Prereq.* *Upperclass standing.*

JRN 1508 Law of the Press 4 QH
Examines legal problems of libel, invasion of privacy, and access to government information; discusses the balance between private rights and the public's "need to know." *Prereq.* *Upperclass standing.*

JRN 1512 Journalism Ethics and Issues 4 QH
Explores the responsibilities of news media and ethical issues confronting decision-makers in journalism. Examines the principles found in codes of the American Society of Newspaper Editors, the Associated Press Managing Editors, the Society of Professional Journalists, and other organizations. Some writing required. *Prereq.* JRN 1501.

JRN 1522 Magazine Writing 4 QH
Covers writing and free-lancing magazine articles; analyzing magazines as markets; and selecting the best feature format—how-to-do-it, profile, personal experience, human interest, interpretive pieces, and others. *Prereq.* JRN 1104 or consent of instructor.

JRN 1530 Advanced Reporting 4 QH
Covers advanced investigative and team reporting, series stories and research, precision reporting. *Prereq.* JRN 1104.

JRN 1540 Sports Public Relations 4 QH
Covers the planning and implementing of public relations functions for professional, amateur, and recreational athletic organizations. Topics stressed include use of journalistic research techniques, implementation of programs, and effective communication with news media and various publics. *Prereq.* JRN 1103, and JRN 1336.

JRN 1552 Advertising Practice 4 QH
Covers the preparation of advertising for print and broadcast media, including campaign planning and space and time buying and scheduling. Includes product research, consumer surveys, and measuring the effects of advertising. *Prereq.* JRN 1451.

- JRN 1561 Public Relations Practice** 4 QH
Demonstrates practices and techniques employed in the field, including organization of events and functions. Studies campaign planning, research, and media relationships. *Prereq.* JRN 1103 and JRN 1336.
- JRN 1575 Publication Production and Management** 4 QH
Examines the organizational structure, production methods, and management procedures of print media companies. Analyzes the interaction of business, advertising, production, and circulation departments. *Prereq.* JRN 1206.
- H JRN 1617 The Constitution and Mass Communications** 4 QH
Explores the meaning of freedom of the press through study and discussion of the evolving First-Amendment interpretations of the United States Supreme Court. *Prereq.* *Upperclass standing.*
- JRN 1635 Journalism and the Mass Media** 4 QH
Presents seminars featuring well-known professionals from major newspapers, radio-TV stations, wire

- services, magazines, photography, and public relations. Offers an up-to-date, in-depth exploration of techniques and theories used in various media.
- JRN 1703 Newswriting 1 (Honors)** 4 QH
Honors equivalent of JRN 1103.
- JRN 1704 Newswriting 2 (Honors)** 4 QH
Honors equivalent of JRN 1104.
- JRN 1870, JRN 1880 Seminar** 4 QH
Offers discussions and readings on topics of current significance in various journalistic fields. *Prereq.* *Upperclass standing.*
- JRN 1890, JRN 1891** 4 QH each
Directed Study in Journalism
- JRN 1892 Topics** 4 QH
- JRN 1894, JRN 1895, JRN 1896, JRN 1897, 1898** 4 QH each
Honors in Journalism

Linguistics

The following linguistics courses are described under the different department headings. The interdepartmental major in linguistics and its corresponding minor are described on page 7 of this catalog.

English

- ENG 1118 Introduction to Language and Linguistics
ENG 1119 History of the English Language
ENG 1401 Introduction to Syntax
ENG 1402 Grammars of English
ENG 1407 Introduction to Semantics
ENG 1408 Topics in Linguistics
ENG 1690/ENG 1691 Seminar in Stylistics or Linguistics
ENG 1810/ENG 1811 Directed Study

Modern Languages

- LNG 1801 Directed Study
LNL 1235 Applied Linguistics
LNL 1236 Applied Linguistics 2

Philosophy and Religion

- PHL 1215 Symbolic Logic
PHL 1440 Philosophy of Language
PHL 1800 Directed Study

Psychology

- PSY 1261 Bilingualism
PSY 1262 Language and Cognition
PSY 1263 Nonverbal Communication
PSY 1264 Animal Communication
PSY 1361 Introduction to Phonetics
PSY 1362 Child Language
PSY 1363 Linguistics of American Sign Language
PSY 1364 Cognition
PSY 1365 Language and the Brain
PSY 1562 Lab in Psycholinguistics
PSY 1661 Seminar in Psycholinguistics
PSY 1662 Seminar in Cognition
PSY 1890 Directed Study

Sociology/Anthropology

- SOA 1135 Language and Culture
SOA 1800 Directed Study

Modern Languages

Please note some courses in the College of Arts and Sciences are duplicated in different departments or colleges, or within a department. You may not receive credit for two such courses. If you have a question about whether one course does overlap with another, please consult the departments involved and the Office of the Dean before taking the course.

Prerequisites listed for modern languages are based on current course numbers at Northeastern. If approved by the Department of Modern Languages and the dean's office, equivalent course work acquired elsewhere may be considered acceptable to satisfy these prerequisites. The following courses are offered in English, and no knowledge of a foreign language is required to take them: LNF 1510, LNF 1511, LNF 1512, LNF 1513, LNI 1510, LNI 1511, LNI 1512, LNR 1500, LNR 1510, LNR 1511, LNS 1500, LNS 1501, and LNS 1510. Locate these courses under the appropriate heading for course descriptions. Language majors interested in obtaining major credit for any of these courses should consult their instructor.

Film

The following film courses are offered by the Department of Modern Languages. For additional film courses, consult the film listings.

LNF 1321 French Film Masterpieces 4 QH
Provides an introduction to some of the qualities that have made French film one of the great national cinemas. Focuses on both form and content; relates outstanding directors' major works to the French culture and society of their period. Taught in English; may be taken for French credit if assignments are completed in French. (Also listed as FLM 1321.)

LNF 1550 Introductory Film Analysis 4 QH
The course's major goal is the cultivation of critical skills in analyzing the film medium, enabling students to articulate ways in which film shapes their experience. The course will be presented in three units: Film Form, Narrative Form, and Film Style. Form, and its most prevalent manifestation, narrative form, can be said to be the way in which the parts of a film are related to one another to create a whole. Style, including mise-en-scène, cinematography, editing, and sound, will be studied in relation to audience expectations and the constitutive role of film form. The course will be organized around weekly film screenings and individual study of films put on reserve in the video section of the Learning Resource Center of Dodge Library.

LNF 1551 Film Theory 4 QH
Investigates the fundamental issues surrounding the nature and possibilities of film art. Introduces a variety of theoretical approaches, including semiotics, auteur theory, psychoanalysis, and feminism. Weekly screenings focus on two or three topics: a film author (such as Buñuel, Truffaut, or Welles), a well-defined film movement (such as neorealism, the New German cinema, or the French New Wave), or films about film-making practice. Coursework includes reading articles and writing a research paper using the resources (including film journals) of Dodge Library. (V)

LNF 1560 Film and Psychoanalysis 4 QH
This course will explore the nature and possibilities of the psychoanalytic interpretation of film. The course will demonstrate that such an approach

offers an additional dimension to the analysis of a work of art. The principal focus will be on elements in the work that are derivative of unconscious processes. Thus, fantasies, dreams, symbolism, and imagery will be given special attention. Material in the works studied that relates to neurotic conflicts, character structure and formation, interpersonal relationships, and distortions in psychological development will be brought into the discussion. Weekly film screenings will be accompanied by lectures and discussions; each student will select one film (placed on reserve in the Learning Resources Center of Dodge Library) for individual study on a topic of his/her choice. (Also listed as FLM 1260.)

LNS 1550 Spanish Film Masterpieces 4 QH
Covers Spanish cinema from 1960 to the present, focusing on recognized masters such as Buñuel and Saura, but including other award-winning films based on novels and events in the Spanish Civil War. Stresses the way the realism of the Spanish cinema is combined with surrealist imagery and metaphor to create a distinctive visual style and content.

The following courses offered in the Department of Modern Languages are conducted in English for possible advanced language credit. Please consult instructor.

LNF 1510 Modern Philosophical French Literature in Translation 4 QH
Camus and Sartre are considered to have been the spokesmen for their generation's philosophical concerns. The course studies works by these two authors and from them develops a working knowledge of existentialism. Course given in English.

LNF 1511 The Theme of Solitude in French Literature 4 QH
The multiple facets of the theme of solitude are traced from the beginnings of French literature to the present. Viewed as a source of both wonder and anguish, solitude is studied in its various manifestations, including banishment, imprisonment, expatriation, and seclusion. The phenomena of moral and spiritual solitude are examined as well. Authors studied include Charles d'Orleans, Du Bellay, Rousseau, Chateaubriand, Hugo, Verlaine, Mauriac, and Camus.

Course conducted in English. Texts read in English translation (those who wish to do so may read them in French).

LNF 1512 Masterpieces of Modern European Fiction 4 QH

Focuses on modern European authors, including Dostoevski, Mann, Kafka, Proust, Gide, and Camus. Views their works as commentaries on their respective societies and, more generally, as investigations of the human condition. Conducted in English.

LNF 1513 French Seminar: Voltaire and Rousseau 4 QH

This course offers an opportunity to study and compare the two great figures of the eighteenth century. Analyzes how, by their contrasting interests, personalities, and views of society, these writers contributed to fundamental changes in the political, philosophical, and literary world of their time—and ours. Includes class discussion, oral and written reports. Conducted in English. Offered in alternate years.

LNI 1510 The Works of Dante in Translation 1 4 QH

This course considers briefly the cultural background and various literary schools that influenced Dante. His life, his character, and minor works are discussed. The *Vita Nuova* and the first cantica of the *Divina Commedia*, the "Inferno," are read and analyzed in some detail. This course is intended for students of any background or major. Bilingual texts are used so that students with a background in Italian and others, may refer to the original for added interest and enrichment. Classes are conducted in English. (III)

LNI 1511 The Works of Dante in Translation 2 4 QH

Continues LNI 1510, but may be taken separately. Studies in detail the other two parts of the *Divina Commedia*, "Purgatorio" and "Paradiso." Open to anyone. Bilingual texts used. Conducted in English.

LNI 1512 Italian Seminar: Pirandello 4 QH

By viewing reality in the world and human personality with strikingly new insights, Pirandello contributed a new dimension to our understanding of human nature and brought about significant changes to the traditional conception of the theatre. This course examines the originality and art of Pirandello by a close study of some of his great plays and short stories. Classwork includes discussions and oral and written reports. Conducted in English. Offered in alternate years.

LNR 1500 Backgrounds in Russian Culture 4 QH

Designed to offer the student a view of Russian culture and civilization; includes guest speakers, films, field trips, and discussions. Conducted in English.

LNR 1510 The Works of Alexander Pushkin in Translation 4 QH

Offers a survey and analysis in English of Pushkin's artistic prose, lyric poetry, correspondence, friendships, and major literary influences.

LNR 1511 Russian Literature in Translation 4 QH

A companion to LNR 1510; provides a survey and analysis in English of some of the works of Tolstoi, Dostoevski, Chekhov, and others.

LNS 1500 Backgrounds in Hispanic Culture 4 QH

A multimedia approach is used to present the rich panorama of the humanities from Altamira to modern times. A reading knowledge of Spanish is helpful but not required, since the course is conducted in English. Field trips, concerts, guest speakers, and individual study projects enhance this exploration of Spanish creativity.

LNS 1501 Backgrounds of Latin American Culture 4 QH

Spans the time from pre-Columbian days to the present in Latin America, exploring culture, traditions, and attitudes. Offers a multimedia approach with field trips and guest lecturers. Conducted in English. (IV)

LNS 1510 Saints and Sinners: The Vision of Women in the Middle Ages and the Renaissance 4 QH

Topics include the attainment of and the atonement for love and society's changing attitude toward women as reflected in the literature of the times. Covers selected fabliaux, short stories, poems, and plays from Boccaccio, Chaucer, Ruiz, Rojas, Machiavelli, Lope de Vega, Calderon, Quevedo, Racine, Middleton, as well as women writers. Reference is made to historical and sociological materials. Conducted in English. All required readings are in translation.

LNS 1511 Introduction to Caribbean Literature 4 QH

Provides a comparative introduction to the modern literary traditions of the Spanish-, English-, and French-speaking Caribbean. Includes authors such as Carpentier (Cuba), Naipaul (Trinidad), Zobel (Martinique), and Cardenal (Nicaragua).

LNS 1512 The Don Juan Figure in Literature 4 QH

This seminar course deals with the emergence and development of the Don Juan figure in Western literature. The course will be taught in English, although it will focus upon many works which were originally written in other languages (they will be read in English translation). It will attempt to analyze the character of Don Juan, beginning with his first appearance in the theater of seventeenth-century Spain, and following his development well into the twentieth century. The course will strive to develop an appreciation and understanding of the character of Don Juan through the centuries, and to analyze the similarities and the differences that may be seen in the character from one cultural milieu to another. (III)

Chinese

LNC 1101 Elementary Chinese 1 4 QH

Designed to acquaint the student with features of spoken and written "Mandarin" Chinese. Stresses grammar, oral performance, and simple characters. Students who wish to speak another dialect of Chinese should consult instructor for proper placement.

LNC 1102 Elementary Chinese 2 4 QH

Continues LNC 1101. Studies grammar and spoken and written forms of the language. *Prereq.* LNC 1101.

LNC 1103 Intermediate Chinese 1**4 QH**

Continues LNC 1102. Covers more advanced features of the language as well as continued study of characters. *Prereq.* LNC 1102.

LNC 1104 Intermediate Chinese 2**4 QH**

Continues LNC 1103. Offers more advanced work in grammar, conversation, and characters. *Prereq.* LNC 1103.

LNC 1801 Directed Study in Chinese**4 QH****French****LNF 1101 Elementary French 1****4 QH**

Designed for students with very little or no prior knowledge of French, this course provides a lively introduction to basic oral expression, listening comprehension, and elementary reading and writing. The audiolingual approach, using practical vocabulary drawn from realistic situations, aims at good pronunciation and ease in response. Each lesson incorporates helpful information about daily life in France and the varied cultures within the world of French speakers. Laboratory practice complements classwork, enables students to work aloud at their own speed, reinforces their acquisition of essential structures, and acquaints them with a vast library of audiovisual resources.

LNF 1102 Elementary French 2**4 QH**

Continues beginners' exposure to the "four skills"—oral comprehension, speaking, reading, and writing French—so that the linguistic tools needed to understand and function in foreign contexts—at home, abroad, and in the world of literature and film—may be acquired. *Prereq.* LNF 1101.

LNF 1103 Intermediate French 1**4 QH**

Designed for students who wish to further their audiolingual skills and improve their reading and writing; combines a review and continued study of grammar essentials with oral, writing, and language lab practice. Varied readings include journalistic, cultural, and modern literary texts. Conducted primarily in French so that students may exercise their new skills. *Prereq.* LNF 1102 or *equiv.*

LNF 1104 Intermediate French 2**4 QH**

This course uses the fundamentals of French to promote effective self-expression through speaking and writing and to explore the idiomatic aspects of the language. Through progressive class discussions and oral and written commentaries, students analyze a contemporary French novel or a French cultural reader, screenplay, or collection of short stories. The course strives, first, to help students read and comprehend modern French writing with confidence, and to be able to talk and write about it in good French; and second, to provide preparation for advanced courses. *Prereq.* LNF 1103.

LNF 1107 Reading French in the Arts and Sciences**4 QH**

Designed for students who wish to develop their reading skills, without regard to other aspects of the language such as speaking and writing. Stresses the grammar necessary for reading, together with vocab-

ulary building. Uses scientific and nonscientific texts. May help graduate and undergraduate students who need to pass a reading examination to fulfill specific degree requirements. *Not* a substitute for LNF 1103 or LNF 1104. *Prereq.* LNF 1102 or *equiv.*

LNF 1111 Elementary French for Business**4 QH**

Similar to LNF 1101, but has added features relevant to business students, such as specialized vocabulary related to the business world and an immediate introduction to French business texts. LNF 1102 can be taken as a sequel to LNF 1111.

LNF 1201 French Composition and Conversation 1**4 QH**

This course is designed for qualified students who wish to work on improving their proficiency in speaking and writing French through oral reports, class discussions, compositions, and an advanced review of fundamentals. Grammar work focuses on the students' particular needs as well as the nuances of the language. Varied readings in a range of styles—popular to literary—provide insight into French life and culture. Conducted in French.

LNF 1202 French Composition and Conversation 2**4 QH**

Continues LNF 1201, with emphasis on individual work, oral presentations, discussions, related grammar, and analysis of readings. Conducted in French. *Prereq.* LNF 1201 or *equiv.*

LNF 1203 Advanced French Proficiency 1**4 QH**

Emphasizes further vocabulary building and mastery of fine points of grammar through written composition, prepared oral reports, and reading and discussion of articles from current periodicals. Gives special attention to the latest trends in spoken French, the study of idioms and proverbs, as well as selected examples of "argot" (slang). *Prereq.* LNF 1201 and LNF 1202 or *equiv.*

LNF 1204 Advanced French Proficiency 2**4 QH**

Continues LNF 1203. Each student is expected to pursue one major project throughout the course, to be completed at the end of the quarter—such as planning and writing an original French magazine with one article to be submitted each week of the term. *Prereq.* LNF 1201 and LNF 1202 or *equiv.*

LNF 1225 Introduction to the French-Speaking World**4 QH**

Offers a cultural introduction to the French-speaking world through the study of various reading selections in the textbook *Le Monde Français*. Stresses vocabulary building and proper usage of a wide variety of grammatical forms; also examines the traditional backgrounds and aspects, as well as the contemporary and "pop" aspects, of the cultural heritage of the world's French speakers. Focuses mainly, but not exclusively, on France. *Prereq.* LNF 1104 or *equiv.*

LNF 1231 Masterpieces of French Literature 1**4 QH**

Provides an introduction to French poetry, theatre (both comedy and tragedy), novels, and autobiographies through the study of key works from the Middle Ages and Renaissance through the Age of Enlightenment. Includes such writers as Villon, Molière, Racine, Voltaire, and Rousseau. Conducted largely in French. Designed to foster a critical approach to

reading, improve reading, speaking, and writing skills; and help students apply these new skills to a greater understanding and appreciation of major French contributions to Western culture. Encourages group discussions in an effort to bring out the relation between the texts and contemporary issues. (II) *Prereq.* LNF 1104 or equiv.

LNF 1232 Masterpieces of French Literature 2 4 QH

Continues LNF 1231, which is not necessarily a prerequisite. Presents some of the most interesting and significant works of literature from the Romantic Age to the present. Readings include an "existential" play by Musset, poetry by Baudelaire and Verlaine, and fiction by Flaubert, Camus, and Robbe-Grillet. For a description of methodology, see LNF 1231. (II) *Prereq.* LNF 1104 or equiv.

LNF 1305 French Literature in the Seventeenth Century 4 QH

Presents a study of the nondramatic literature of seventeenth-century France from the baroque through the classical periods. Covers a rich and diverse body of writing encompassing philosophy, poetry, the novel, and epistolary writing. Among the authors treated are Descartes, Pascal, La Rochefoucauld, La Fontaine, Boileau, Mme. de Sévigné, and Mme. de La Fayette. Offered every other year. *Prereq.* LNF 1232 or equiv.

LNF 1306 French Theatre in the Seventeenth Century 4 QH

Studies the dramatic literature of seventeenth-century France, from the baroque through the classical periods. Studies tragedy in the works of Corneille and Racine; comedy, in those of Molière. Offered every other year. *Prereq.* LNF 1232 or equiv.

LNF 1307 French Literature of the Eighteenth Century 1 4 QH

The eighteenth century in France, known as the Age of Enlightenment, was an age of challenge to established authority in all areas and an age of changing ideas and ideals. This intellectual and political vitality is reflected in the representative works of Marivaux, Montesquieu, Prevost, and Voltaire. Classwork includes discussions, oral and written reports. Conducted in French, but English is allowed. Offered every other year. *Prereq.* LNF 1232 or equiv.

LNF 1308 French Literature of the Eighteenth Century 2 4 QH

Toward the latter half of the century we begin to see both the achievements brought about by the spirit of enlightenment and the awakening of the romantic sensibility, in such authors as Diderot, Rousseau, St. Pierre, Laclos, and Beaumarchais. Classwork includes discussions, oral and written reports. Conducted in French, but English is allowed. Offered in alternate years. *Prereq.* LNF 1232 or equiv.

LNF 1309 French Literature of the Nineteenth Century 1 4 QH

Romanticism is treated as a major cultural phenomenon affecting each person's view of the world and the way he/she expresses experience. In this context, the course examines romanticism in poetry and drama, as well as its continuation into the realist

novel. Readings include Victor Hugo in poetry and the drama and Honoré de Balzac in the novel, as well as selections from other writers who represent aspects of romanticism and realism. Conducted principally in French. Offered every other year. *Prereq.* LNF 1232 or equiv.

LNF 1310 French Literature of the Nineteenth Century 2 4 QH

Explores the reaction against romanticism: aestheticism and personal modes of expression in contrast to the enthusiasm of the early romantics. Readings include a novel by Gustave Flaubert and the verse of Charles Baudelaire in *Les Fleurs du Mal*, as well as the poets who followed in his footsteps. Considers Flaubert and Baudelaire as precursors of modern literature. Conducted principally in French. Offered every other year. *Prereq.* LNF 1232 or equiv.

LNF 1311 French Literature of the Twentieth Century 1 4 QH

Offers a study of the major movements in the narrative and dramatic prose writers prior to World War 2, including Alain-Fournier, Proust, Claudel, Gide, Mauriac, and Saint Exupéry. Requirements include reading a work from each author, discussing it in class, and presenting oral and written reports. Conducted in French, but English may be used. Offered in alternate years. *Prereq.* LNF 1232 or equiv.

LNF 1312 French Literature of the Twentieth Century 2 4 QH

Focuses on the trends in postwar fiction, with particular consideration of the struggle to find meaning in an absurd world. Analyzes significant works by Giraudoux, Montherlant, Sartre, Camus, Anouilh, Ionesco, and Beckett. Classwork includes oral and written reports, class discussions. Conducted in French, but English may be used. Offered in alternate years. *Prereq.* LNF 1232 or equiv.

LNF 1315 French Poetry, Past and Present 4 QH

From the Middle Ages to the present day, French poets have derived inspiration from such universal themes as love, nature, and the human condition. This course will provide students with a survey of French poetry through the ages, focusing on representative works of the major French poets. Poems will be studied in their literary and historical context, with an examination of various aspects of French versification. Conducted in French.

LNF 1400 Seminar: Critical Methodology and Practice in French Literature 4 QH

Treats one modern French writer in terms of a critical methodology developed in the first part of the seminar based on modern critical practice. *Prereq.* Excellent reading knowledge of French.

LNF 1401 Seminar: Trends in Modern French Literature 4 QH

Examines a trend in modern French literature and develops a critical methodology useful for this analysis. *Prereq.* Excellent reading knowledge of French.

LNF 1801, LNF 1802, LNF 1803, LNF 1804, LNF 1805 Directed Study **4 QH each**

Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Will not be given in areas adequately covered by existing courses. Priority given to language majors and to juniors and seniors.

LNF 1820, LNF 1821, LNF 1822, LNF 1823 Junior/Senior Honors Program **4 QH each**

For details contact the Honors Office, 183 Holmes.

German

Prerequisites listed for modern languages are based on current course numbers at Northeastern. Equivalent coursework done elsewhere will be considered acceptable to satisfy these prerequisites.

LNG 1101 Elementary German 1 **4 QH**

This course is designed to provide instruction in the basic grammatical structure of German through practice in listening comprehension, speaking, reading, and writing. Instruction is provided in the classroom and in the language lab. No previous study of German necessary. (Special sections of this course are run for business students.)

LNG 1102 Elementary German 2 **4 QH**

A continuation of LNG 1101, this course emphasizes helping students to increase their knowledge of the basic grammatical structure of German and to develop additional flexibility in the four language skills. (Special sections of this course are run for business students.) *Prereq.* LNG 1101 or equiv.

LNG 1103 Intermediate German 1 **4 QH**

Offers a comprehensive review and reinforcement of the major aspects of German grammar and usage; continues to explore the four major skills of listening comprehension, speaking, reading, and writing; introduces the student to the reading of contemporary literary texts, including a full-length play—*Biedermann und die Brandstifter*, by the Swiss playwright Max Frisch. *Prereq.* LNG 1102 or equiv.

LNG 1104 Intermediate German 2 **4 QH**

The course aims at helping students enlarge vocabulary and develop increased flexibility in the four basic language skills. Included are completion of grammar review, continued exposure to modern literary texts. One full-length play is read—*Der Besuch der alten Dame*, by the contemporary Swiss dramatist Friedrich Dürrenmatt. Successful completion of this course entitles the student to choose from among the upper-level course offerings in the areas of German literature and/or composition and conversation. *Prereq.* LNG 1103 or equiv.

LNG 1107 Reading German **4 QH**

This course is designed for those students who wish to develop their reading skills, without regard to other aspects of the language, such as speaking or writing. The grammar necessary for reading is stressed, together with vocabulary building; scien-

tific and nonscientific texts are read. This course may provide assistance to students, graduate and undergraduate, who need to pass a reading examination to fulfill specific degree requirements.

LNG 1111 Business German 1 **4 QH**

Provides an introduction to written German in business administration usage as found in general-purpose professional texts. Develops grammatical knowledge and competence in reading comprehension, translation, and phonetic accuracy. Considers the Federal Republic of Germany as an internationally leading economic power. Discusses weekly readings (in English) from trade publications on aspects of the German business world, including foreign and U.S. trade. Assumes no prior knowledge of German.

LNG 1201 German Composition and Conversation 1 **4 QH**

This course strives to develop facility in speaking and writing German and stresses active use of the language. Students are provided an opportunity for practice in listening comprehension through German language films or tape-recorded interviews with native German speakers; expansion of vocabulary through guided group discussions on topics of general interest; and development of language skills in areas of individual interest through preparation of oral reports in German. Compositions are assigned on a weekly basis and grammar is reviewed as needed. Utilization of language lab. Recommended for students preparing for co-op in Germany. *Prereq.* LNG 1104 or equiv.

LNG 1202 German Composition and Conversation 2 **4 QH**

Continuation of German LNG 1201 in content and format with emphasis on independent communication skills. Recommended for students preparing for co-op in Germany. *Prereq.* LNG 1201 or equiv.

LNG 1203 Advanced German Proficiency 1 **4 QH**

The course offers intensive training in spoken and written German with the aim of providing students an opportunity to increase vocabulary and develop flexibility in the use of the language. Included are student-led discussions of German society and current affairs based on readings of current journals and periodicals; weekly written assignments; review and practice of grammar where necessary. *Prereq.* LNG 1201 and LNG 1202, or permission of instructor.

LNG 1231 Masterpieces of German Literature 1 **4 QH**

The course includes a survey of the major trends in the development of German literature from the Hildebrandslied to Martin Luther. In addition, reading of selected works of major authors of the twentieth century such as Hauptmann, Kafka, Mann, Brecht, Dürrenmatt, and Boll. Choice of works to be read in a particular term will be based partially on theatre performances or film showings planned in the Boston area. Class attendance of these performances is anticipated. Recommended as an introductory step to literature courses LNG 1307 and above. Offered every other year, alternating with LNG 1232. *Prereq.* LNG 1104 or equiv.

LNG 1232 Masterpieces of German Literature 2 4 QH

Studies short fiction from Goethe to the present. Includes Goethe's *Die Leiden des Jungen Werthers*, ETA Hoffman's stories of fantasy and madness, Thomas Mann's *Der Tod in Venedig*, and Franz Kafka's *Die Verwandlung*, as well as stories by Böll, Grass, Christa Wolff, and others. Complements readings and lectures in German with musical and screen adaptations of the works. Recommended as an introduction to literature courses LNG 1307 and above. May be taken before LNG 1231. *Prereq.* LNG 1104 or equiv.

LNG 1307 Classical Period of German Literature 4 QH

The course provides background and general survey of the period from 1750 to 1800, with particular emphasis on the works of Lessing and Schiller. Among the dramas read are Lessing's *Minna von Barnhelm* and *Nathan der Weise*, and Schiller's *Maria Stuart* and *Die Jungfrau von Orleans*. Lectures (in German) and reports. *Prereq.* LNG 1232 or equiv.

LNG 1308 The Works of Goethe 4 QH

Studies drama, prose writing, and lyric poetry of Goethe: *Faust*, Part 1; *Hermann Und Dorothea*; *Egmont*; and *Iphigenie auf Tauris*. Lectures (in German) and reports. *Prereq.* LNG 1232 or equiv.

LNG 1309 German Literature of the Nineteenth Century 4 QH

The course offers background and general survey of German literature of the nineteenth century, with particular attention to prose and lyric poetry. The lyric poetry includes poems of all the important romantic poets, beginning with Holderlin, Tieck, Novalis, and extending through Morike. Among the prose works discussed are *Novellen* by Eichendorff, Tieck, Chamisso, Kleist, Fougue, Keller, Meyer, and Ludwig. Lectures (in German) and reports. *Prereq.* LNG 1232 or equiv.

LNG 1310 German Drama of the Nineteenth Century 4 QH

Dramas read are selected from Germany's foremost dramatists of the nineteenth century, including Kleist, Hebbel, Grillparzer, and Ludwig. Lectures (in German) and reports. *Prereq.* LNG 1232 or equiv.

LNG 1311 German Literature of the Twentieth Century 4 QH

Considers lyric poetry and prose works of important German writers of the twentieth century, including Schnitzler, Hauptmann, Mann, and Kafka. Lectures (in German) and reports. *Prereq.* LNG 1232 or equiv.

LNG 1312 German Drama of the Twentieth Century 4 QH

Plays are selected from those by important dramatists of the twentieth century, including Schnitzler, Hauptmann, Sudermann, Hofmannsthal, Wedekind, Kaiser, Toller, and Brecht. Lectures (in German) and reports. *Prereq.* LNG 1232 or equiv.

LNG 1315 The German Lyric 4 QH

The course offers a survey of the German lyric from the twelfth century to the present. Analysis and interpretation of representative selections from major lyric poets such as Walther von der Vogelweide,

Gerhard, Fleming, Gryphius, Klopstock, Claudius, Goethe, Schiller, Holderlin, Eichendorff, Brentano, Heine, Morike, Storm, Meyer, Rilke, and Brecht. Background of the development of the German lyric, movements, and types. Class discussions and reports. *Prereq.* LNG 1232 or equiv.

LNG 1316 The Dramatic Works of Franz Grillparzer 4 QH

The course includes reading, analysis, and interpretation of representative works of Franz Grillparzer, Austria's greatest dramatist: *Sappho*, *Des Meeres und der Liebe Wellen*, *Der Traum ein Leben*, *König Ottokars Gluck und Ende*, and the novella, *Der arme Spielmann*. Collateral readings, discussions, and reports. *Prereq.* LNG 1232 or equiv.

LNG 1801, LNG 1802, LNG 1803, LNG 1804, LNG 1805 Directed Studies 4 QH each

Directed studies offer students a way of going beyond work given in the regular curriculum and may also serve as a means to complete major or minor requirements in certain situations. Directed studies will not be given in areas adequately covered by existing courses. Priority is given to language majors and to juniors and seniors.

LNG 1820, LNG 1821, LNG 1822, LNG 1823 Junior/Senior Honors Program 4 QH each

For details contact the Honors Office, 183 Holmes.

Italian

Prerequisites listed for modern languages are based on current course numbers at Northeastern. Equivalent course work done elsewhere will be considered acceptable to satisfy these prerequisites.

LNI 1101 Elementary Italian 1 4 QH

For the beginner who wants instruction in the essentials of Italian grammar and the opportunity to practice speaking and reading the language.

LNI 1102 Elementary Italian 2 4 QH

Continued study of grammar and basic language skills. Practice in more advanced conversation and reading. *Prereq.* LNI 1101 or equiv.

LNI 1103 Intermediate Italian 1 4 QH

Review of grammar. Progressively more intensive practice in oral and written communication. Reading will be from selected modern texts. *Prereq.* LNI 1102 or equiv.

LNI 1104 Intermediate Italian 2 4 QH

Review of grammatical difficulties, with attention given to current idiomatic forms. Greater emphasis on self-expression. Reading of short stories or a modern novel. *Prereq.* LNI 1103 or equiv.

LNI 1201 Italian Composition and Conversation 1 4 QH

For students who have mastered the fundamentals of the language. There will be no study of grammar as such. The course aims at helping students strengthen speaking and writing ability through an analysis of the language, oral and written reports, and general discussions on a variety of topics. Conducted entirely in Italian. *Prereq.* LNI 1104 or equiv.

LNI 1202 Italian Composition and Conversation 2 4 QH

Continuation of LNI 1201, with stress on individual work, free discussions, and compositions. Conducted entirely in Italian. *Prereq.* LNI 1201 or equiv.

LNI 1231 Masterpieces of Italian Literature 1 4 QH

Introductory course in Italian literature covering the *Trecento* to the seventeenth century. An analysis will be made of major trends and writers beginning with the *doice stil nuovo*, Dante's *Vita Nuova*, and continuing with readings from Petrarca's *Canzoniere*, Boccaccio's *Decameron*, and Machiavelli's *La Mandragola*. Discussion of the readings, oral and written reports. Conducted basically in Italian, but students are allowed to express themselves in English. *Prereq.* LNI 1104 or equiv.

LNI 1232 Masterpieces of Italian Literature 2 4 QH

Continuation of LNI 1231, but may be taken separately. This course concentrates on authors from the eighteenth to the twentieth centuries, such as Goldoni, Leopardi, Verga, Pirandello, Moravia, Levi, and Buzzati. A novel, a play, or poetry selections from each author will be discussed. Oral and written reports. Conducted in Italian, but students may use English. *Prereq.* LNI 1104 or equiv.

LNI 1311 Italian Literature of the Twentieth Century 1 4 QH

Reading and discussion of some of the novels, plays, and poems from a variety of literary trends and styles that evolved between the turn of the century and World War 2. Among the authors studied are Verga, Pascoli, D'Annunzio, Pirandello, Deledda, and Svevo. Oral and written reports. The course will be conducted in Italian, but students may use English. Offered in alternate years. *Prereq.* LNI 1232 or equiv.

LNI 1312 Italian Literature of the Twentieth Century 2 4 QH

The postwar period to the present. Many important authors have arisen since the early forties, and their books reflect the preoccupations, moods, and aspirations of our changing times. Among the writers considered in this course are Moravia, Silone, Vittorini, Pavese, Guareschi, Buzzati, Sciascia, Ungaretti, Montale, and Quasimodo. Oral and written reports are required. English may be used, but the course will be conducted in Italian. Offered in alternate years. *Prereq.* LNI 1232 or equiv.

LNI 1801, LNI 1802, LNI 1803, LNI 1804, LNI 1805 Directed Studies 4 QH each

Directed studies offer students a way of going beyond work given in the regular curriculum and may also serve as a means to complete major or minor requirements in certain situations. Directed studies will not be given in areas adequately covered by existing courses. Priority is given to language majors and to juniors and seniors.

LNI 1820, LNI 1821, LNI 1822, LNI 1823 Junior/Senior Honors Program 4 QH each

For details contact the Honors Office, 183 Holmes.

Russian

Prerequisites listed for modern languages are based on current course numbers at Northeastern. Equivalent coursework done elsewhere will be considered acceptable to satisfy these prerequisites.

LNR 1101 Elementary Russian 1 4 QH

The course includes essentials of grammar, practice in pronunciation, progressive acquisition of a basic vocabulary, idiomatic expressions.

LNR 1102 Elementary Russian 2 4 QH

Continuation of grammar study; oral and written exercises. *Prereq.* LNR 1101.

LNR 1103 Intermediate Russian 1 4 QH

Designed to help further the student's knowledge of Russian through oral and written work; the study of grammar and reading texts of moderate difficulty. *Prereq.* LNR 1102.

LNR 1104 Intermediate Russian 2 4 QH

Continuation of work and aims of LNR 1103. *Prereq.* LNR 1103.

LNR 1107 Scientific Russian 4 QH

The course offers readings of Russian texts in mathematics, physics, chemistry, astronomy, biology, and medical science. Designed to help prepare the student for the department reading examination in his or her chosen field. As far as possible, texts are selected on the basis of the students' needs and interests. *Prereq.* LNR 1104 or equiv.

LNR 1201 Russian Composition and Conversation 1 4 QH

Designed to assist students in developing skills in speaking and writing by means of detailed grammar review and extensive use of audio-visual media. Conducted in Russian. *Prereq.* LNR 1104 or equiv.

LNR 1202 Russian Composition and Conversation 2 4 QH

A continuation of LNR 1201 with an increased emphasis on speaking the colloquial Russian idiom. Conducted in Russian. *Prereq.* LNR 1201 or equiv.

LNR 1203 Advanced Russian Proficiency 1 4 QH

Emphasizes speaking and writing skills through the study of Russian word formation and derivation. Weekly compositions or oral reports are required. Conducted in Russian. *Prereq.* LNR 1202 or equiv.

LNR 1204 Advanced Russian Proficiency 2 4 QH

Emphasizes speaking and writing skills through the study and use of Russian idioms and colloquialisms. Conducted in Russian. *Prereq.* LNR 1203 or equiv.

LNR 1205 Stylistics and Advanced Grammar Analysis 1 4 QH

Designed for students pursuing a major or minor in the Russian language; focuses on modern usage of the Russian language through newspaper and magazine articles and short stories. *Prereq.* LNR 1104 or permission of instructor.

LNR 1206 Stylistics and Advanced Grammar Analysis 2 4 QH

Continues goals of LNR 1205 and also focuses on helping students improve listening comprehension

through the use of extensive lab work. *Prereq.* LNR 1205 or permission of instructor.

LNR 1309 Russian Short Stories of the Nineteenth Century 4 QH

Offers detailed analysis of selected representative short stories read in Russian; study of the development of this genre. *Prereq.* LNR 1104 or equiv.

LNR 1315 Russian Expository Prose 4 QH

Selected readings of lectures, speeches, essays, and critical studies by outstanding Russian scholars. *Prereq.* LNR 1104.

LNR 1316 Russian Folklore 4 QH

Various genres of Russian folk literature are read in Russian. Readings are supplemented with lectures and tape recordings. *Prereq.* LNR 1104.

LNR 1317 Russian Poetry 4 QH

Analyzes in Russian the major works of important classical and modern poets. *Prereq.* LNR 1104.

LNR 1801, LNR 1802, LNR 1803, LNR 1804, LNR 1805 Directed Studies 4 QH each

Directed studies offer students a way of going beyond work given in the regular curriculum and may also serve as a means to complete major or minor requirements in certain situations. Directed studies will not be given in areas adequately covered by existing courses. Priority is given to language majors and to juniors and seniors.

LNR 1820, LNR 1821, LNR 1822, LNR 1823 Junior/Senior Honors Program 4 QH each

For details contact the Honors Office, 183 Holmes.

Spanish

Prerequisites listed for modern languages are based on current course numbers at Northeastern. Equivalent coursework done elsewhere may be considered

LNS 1101 Elementary Spanish 1 4 QH

Presents essentials of correct usage through acquisition of basic skills in reading, writing, speaking, and aural comprehension.

LNS 1102 Elementary Spanish 2 4 QH

Continues language instruction with increasing attention to vocabulary and skills relevant to persons who wish to become involved with the Hispanic world. *Prereq.* LNS 1101 or equiv.

LNS 1103 Intermediate Spanish 1 4 QH

Includes completion of basic grammatical usage; reading of contemporary Hispanic plays; and oral and written communication based upon assigned readings. *Prereq.* LNS 1102 or equiv.

LNS 1104 Intermediate Spanish 2 4 QH

Offers intensive reading of current topics, conversation practice utilizing skills acquired in previous coursework, and composition practice based upon varied assigned topics. *Prereq.* LNS 1103 or equiv.

LNS 1105 Conversational Spanish 1 4 QH

Emphasizes developing the ability to speak and comprehend Spanish. Particularly able students may be accepted after having completed only LNS 1103. In

this case, LNS 1105 may be used to satisfy the language requirement. *Prereq.* LNS 1104 or equiv.; open to nonmajors only.

LNS 1106 Conversational Spanish 2 4 QH

Continues LNS 1105, with further emphasis on the development of oral facility in Spanish. Particularly able students may be accepted after having completed only LNS 1104. *Prereq.* LNS 1105 or equiv.; open to nonmajors only.

LNS 1130 Intensive Spanish 8 QH

This course encompasses the same material covered in LNS 1101 and LNS 1102. Students with language-learning ability and a commitment to the study of foreign languages are encouraged to take the course. Students are expected to assimilate the material at an accelerated pace. This is a two-sequence course; students must enroll in both sequences. Satisfactory completion of this course enables the student to take LNS 1103.

LNS 1201 Spanish Composition and Conversation 1 4 QH

Offers practice in writing and speaking Spanish, including written and oral resumes, prepared speeches and themes, and impromptu speaking and writing. Reviews the more subtle problems of grammar.

LNS 1202 Spanish Composition and Conversation 2 4 QH

Offers further practice in oral and written Spanish; continues study of advanced Spanish grammar. *Prereq.* LNS 1201 or equiv.

LNS 1203 Advanced Spanish Proficiency 1 4 QH

Designed for those preparing to enter the teaching profession as well as qualified advanced students. Covers advanced elements of Spanish syntax, with emphasis upon achieving superior speaking, reading, and writing skills. *Prereq.* Permission of instructor.

LNS 1204 Advanced Spanish Proficiency 2 4 QH

Continues the aims and goals of LNS 1203. *Prereq.* LNS 1203 and permission of instructor.

LNS 1231 Masterpieces of Spanish Literature 1 4 QH

Traces the development of Spanish literature from the Middle Ages (las jarchas, *El poema del Cid*, *El libro de buen amor*, *La Celestina*) through the Renaissance and Baroque periods or Golden Age (Garcilaso de la Vega, the picaresque novel, the mystics, Cervantes, Lope de Vega, Calderon). Conducted in Spanish. (II) *Prereq.* LNS 1104 or equiv.

LNS 1232 Masterpieces of Spanish Literature 2 4 QH

Continues LNS 1231. Surveys the literature of eighteenth-, nineteenth-, and twentieth-century Spain. Includes the literary movements of romanticism, realism, and the generation of '98. Conducted in Spanish. (II) *Prereq.* LNS 1104 or equiv.

LNS 1301 Spanish Literature of the Middle Ages 4 QH

Studies selections from the major works of the Middle Ages, from *El poema del Cid* to the *Libro de buen amor*. Conducted in Spanish. *Prereq.* LNS 1232 or equiv.

LNS 1303 Spanish Literature of the Fifteenth and Sixteenth Centuries 4 QH

Examines selections from the major works of the fifteenth and sixteenth centuries. Works considered include *La Celestina*, *Lazarillo de Tormes*, and *El Romancero*. Conducted in Spanish.

LNS 1305 Cervantes and His Times 4 QH

Examines selections from Cervantes' minor works (the *Entremeses* and the *Novelas ejemplares*); emphasis, however, is on *Don Quixote*, Spain's greatest literary masterpiece. Conducted in Spanish. *Prereq.* LNS 1232 or equiv.

LNS 1306 Spanish Golden Age Theatre 4 QH

Examines plays by the outstanding dramatists of the seventeenth century: Lope de Vega, Calderon de la Barca, Tirso de Molina, Ruiz de Alarcon, and others. Conducted in Spanish. *Prereq.* LNS 1232 or equiv.

LNS 1309 Spanish Literature of the Nineteenth Century 1 4 QH

Covers readings in the prose, poetry, and drama of the romantic period, including selections from el Duque de Rivas, Larra, Espronceda, Zorrilla, and Becquer. Conducted in Spanish. *Prereq.* LNS 1232 or equiv.

LNS 1310 Spanish Literature of the Nineteenth Century 2 4 QH

Offers a study of some of the major novelists of the second half of the nineteenth century, such as J. M. de Pereda, Juan Valera, Emilia Pardo Bazan, and B. Perez Galdos. Conducted in Spanish. *Prereq.* LNS 1232 or equiv.

LNS 1311 Spanish Literature of the Twentieth Century 1 4 QH

Examines selections from the writings of the Generation of '98: Unamuno, Valle-Inclan, Pio Baroja, Benavente, Azorin, and the Machado brothers. *Prereq.* LNS 1232 or equiv.

LNS 1312 Spanish Literature of the Twentieth Century 2 4 QH

Focuses on prose and poetry of modern writers, such as Ortega y Gasset, Perez de Ayala, Garcia Lorca, Juan Ramon Jimenez, Gironella, and Jose Cela. *Prereq.* LNS 1232 or equiv.

LNS 1315 Latin American Literature 4 QH

Focuses on early Latin American literature: the literature of the colonial period and the early nineteenth century, based primarily on selections from an anthology. *Prereq.* LNS 1232 or equiv.

LNS 1316 Latin American Literature 4 QH

Focuses on modern Latin American literature; readings from nineteenth- and twentieth-century prose and poetry. *Prereq.* LNS 1232 or equiv.

LNS 1400 Spanish Seminar 4 QH

This course is designed primarily for majors who have progressed to the upper-level literature courses

in Spanish. However, nonmajors who show exceptional background may be admitted with the instructor's permission. The course focuses upon a narrowly defined theme (that is, a single author, a single work, or a single theme), which students are asked to explore in depth; students are expected to present a final paper based upon individual research.

LNS 1401 Seminar in Spanish Literature 4 QH

This is an upper-level literature course designed primarily for majors, although nonmajors who show exceptional background in Spanish may be admitted. Students are expected to read a selected group of Galdos's novels, and the class meetings will concentrate on a detailed discussion and analysis of the works read. There are collateral readings as well, and a final paper on a topic to be selected by the student. *Prereq.* Permission of instructor.

LNS 1402 Seminar in the Contemporary Spanish Theatre 4 QH

In contrast to the bourgeois theatre of consumption in Spain, there exist a number of dramatists committed to revealing the tragic social and existential aspects of the human condition. Emphasis is placed on authors such as Vallejo, Sartre, the members of the *generacion realista*, and the "underground" playwrights. Classes are conducted in Spanish. Class participation as well as oral and written projects required. Alternates yearly with LNS 1401. *Prereq.* LNS 1232 or permission of instructor.

LNS 1801, LNS 1802, LNS 1803, LNS 1804, LNS 1805 Directed Studies 4 QH each

Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Will not be given in areas adequately covered by existing courses. Priority given to language majors and to juniors and seniors.

LNS 1820, LNS 1821, LNS 1822, LNS 1823 Junior/Senior Honors Program 4 QH each

For details contact the Honors Office, 183 Holmes.

LNL 1235 Applied Linguistics 4 QH

Explores the process of language learning and the nature of this experience for infants and adults. Emphasizes the child's ability to master successfully the complex essentials of its first language by the age of five, and how the development of cognitive capacity and language-learning ability are related. Discusses the role of the parent and of the physical environment. Other topics include second-language learning, contrastive analysis, learning English as a second language or dialect, sign language, the significance of "errors," learning strategies, and a survey of language-teaching methods.

Mathematics

The mathematics department offers several sequences of courses that may overlap in content. Please consult the mathematics department if you have any questions regarding course content. You will not receive credit for two courses that overlap in content.

Numbers inside parentheses within course descriptions refer to core curriculum categories, listed on page 2.

MTH 1000 Mathematics Preliminaries 1 4 QH

Supplies, together with MTH 1010, the high school math background necessary for a student to enroll in MTH 1101, MTH 1106, or MTH 1113. Includes the arithmetic of signed numbers, fractions, decimals, and percents; algebraic manipulation and solution of simple equations; elementary word problems; and laws of exponents. *Prereq.* Permission of course coordinator.

MTH 1010 Mathematics Preliminaries 2 4 QH

Supplies, together with MTH 1000, the high school math background necessary for a student to survive in MTH 1101, MTH 1106, or MTH 1113. Includes quadratic equations and systems of equations; graphing (including slope of a line and vertex of a parabola), more word problems; logarithms, trigonometry, or some of both at the instructor's discretion. (In winter and spring quarters, the material covered in MTH 1000 is assumed; in the fall quarter, there is an overlap with MTH 1000 on solving equations, word problems, and laws of exponents.)

MTH 1101 Basic Algebraic Applications 4 QH

Examines systems of linear equations and their graphs. Focuses on graphing systems of linear inequalities in two variables with application to linear programming. Introduction to matrices, matrix multiplication, and vectors. (I) *Students do not receive credit for MTH 1101 if they have already received credit for MTH 1113.*

MTH 1103 Basic Probability 4 QH

Covers introduction to probability, sample spaces with equiprobable events, permutations and combinations, conditional probability. Also discusses random variables, introduction to Markov processes.

MTH 1106 Fundamentals of Mathematics 4 QH

Examines how to solve various kinds of algebraic equations: linear, quadratic, and linear systems in two and three unknowns. Considers applications to word problems such as motion, mixture, and variational problems. Covers the concept of function, graphs, line slopes, and graphs of polynomials. Also discusses some elementary trigonometry and vectors in the plane.

MTH 1107 Functions and Basic Calculus 4 QH

Introduces differential calculus. Examines elementary rules of differentiation with application to graph sketching and to maximum and minimum problems. Discusses exponential and logarithmic functions with applications to compound interest, population growth, and radioactive decay. (I) *Students do not receive credit for MTH 1107 if they have already received credit for MTH 1114.*

MTH 1108 Calculus 4 QH

Offers a review and continuation of differential calculus, graphing and differentiation of trigonometric functions; also presents an introduction to integral calculus with applications to geometric problems and differential equations.

MTH 1113 College Mathematics for Business 4 QH

Focuses on sets, rectangular coordinates and graphs, functions and functional notation, linear and quadratic functions, exponential and logarithmic functions, systems of linear equations, summations, inequalities, permutations and combinations, elementary probability concepts, arithmetic and geometric progressions, and simple and compound interest annuities. *Students do not receive credit for MTH 1113 if they have already received credit for MTH 1101.*

MTH 1114 Calculus for Business 4 QH

Focuses on matrices; Gaussian elimination inverses of matrices; systems of linear inequalities; feasible regions; graphical solution of linear programming problems; limits; derivatives; differentiation of polynomials and of exponential and logarithmic functions; maxima, minima, and points of inflection; optimization in nonlinear problems; and marginal analysis of cost revenue and profit functions. *Prereq.* MTH 1113 or equiv. *Students do not receive credit for MTH 1114 if they have already received credit for MTH 1107.*

MTH 1120, MTH 1121 Calculus 6 QH each

Assists students in overcoming deficiencies in precalculus mathematics without losing ground in the MTH 1123 sequence. Reviews high school algebra, introduces trigonometric functions, and covers the material in MTH 1123 and MTH 1124. Includes lecture and homework review sessions. (Students placed in this course by request or on the basis of their College Board scores and the results of an orientation-week diagnostic test.)

MTH 1123 Calculus 1 4 QH

Introduces the differential calculus of one variable, including trigonometric, exponential, and logarithmic functions, together with their graphs. Includes average rates of change, instantaneous rates of change, derivatives, and the chain rule. Covers curve sketching, applications of the derivative to problems involving related rates, and maxima and minima.

MTH 1124 Calculus 2 4 QH

Introduces integral calculus including areas, volumes, and other applications. Studies integration

involving trigonometric, inverse trigonometric, exponential, and logarithmic functions. Introduces differential equations. *Prereq.* MTH 1123.

MTH 1125 Calculus 3 4 QH
Studies the calculus of elementary functions in the context of complex numbers. Includes infinite series as well as second order differential equations. *Prereq.* MTH 1124.

MTH 1128 Calculus 3 4 QH
Examines further techniques of integration, graphs in two- and three-dimensions, double and triple integrals, and applications. *Prereq.* MTH 1124. *Only for students in the previous engineering curriculum.*

MTH 1133 Calculus for Biology Majors 1 4 QH
Presents an introduction to calculus with applications to biology, ecology, and medicine. Includes differentiation, curve sketching, anti-differentiation, and exponential functions.

MTH 1134 Calculus for Biology Majors 2 4 QH
Continues MTH 1133. Includes exponential growth and decay; integration and area; rules for differentiation; and functions of several variables, with LaGrange multipliers, total differentials, and the method of least squares. *Prereq.* MTH 1133.

MTH 1135 Calculus for Biology Majors 3 4 QH
Continues MTH 1134. Includes the natural logarithm; trigonometric functions; techniques of integration, including numerical methods and differential equations, with separation of variables and qualitative methods. *Prereq.* MTH 1134.

MTH 1137 Discrete Mathematics 1 4 QH
Examines proof methods: induction, case analysis, contradiction; binary, octal and hexadecimal numbers; modular arithmetic; sets, relations, equivalences, functions; combinations, permutations, elementary counting, and discrete probability; and elementary graph theory. *Prereq.* MTH 1123.

MTH 1143 Calculus 1 4 QH
Presents introductory calculus primarily for mathematics, physics, and chemistry majors. Together with MTH 1144 and MTH 1145, includes derivatives and integrals of one-variable functions; applications to curve sketching, maxima and minima problems, area, moments, simple volumes, etc.; approximation methods, including numerical integration, root finding, Taylor series, and power series. Requires students to master the use of the computer to make value tables and plot curves and to implement simple numerical algorithms.

MTH 1144 Calculus 2 4 QH
Continues MTH 1143. *Prereq.* MTH 1143.

MTH 1145 Calculus 3 4 QH
Continues MTH 1144. *Prereq.* MTH 1144.

MTH 1150 Probability, Statistics, and the Computer 4 QH
Presents a computer-oriented introduction to statistical methods, with applications in the social and life sciences. Examines descriptive statistics, elementary probability, correlation and regression, and the fundamentals of statistical inference (confidence

intervals and hypothesis testing) with a minimum of mathematical derivations. Uses a statistical computer package such as MINTAB or SPSS to solve supplementary problems. (I) *Prereq.* Nonmath majors.

MTH 1152 Statistical Thinking 4 QH
Introduces the statistical style of thinking for students without mathematical sophistication or who ordinarily don't like mathematics. Assigns readings will from a wide variety of sources. Uses extensive class discussion and homework problems (some on a computer) to teach students to use statistics and to critically evaluate the use of statistics by others. Covers descriptive statistics, statistical tests, confidence intervals, regression, and sampling. (II)

MTH 1160 Introduction to Computers 1 4 QH
Introduces computers and considers their applications; also introduces computer programming so that the uses and limitations of computers can be discussed intelligently. Presents small programs to be written and run. Considers applications such as sorting, searching, data processing, simulation, and artificial intelligence. *Prereq.* Nonmath majors.

MTH 1163 Introduction to Computers and Computation 4 QH
Offers an introduction to problem solving with the use of computers. Expects students to design, write, debug, and test programs in BASIC programming language. Includes application of programming to a wide variety of problems, including statistical analysis of data, plotting, artificial intelligence, and text processing.

MTH 1172 Introduction to Computer Science 4 QH
Deals with problem solving in the context of computing. Focuses on structured programming using PASCAL language. Stresses correctness, clarity, and reliability of programs. (II)

MTH 1183 Mainstreams of Mathematics 4 QH
Traces the development of some key mathematical ideas, their historical context, and current applications. May include mathematical games and puzzles; number systems past and present; logic and computers; calculus and the rise of modern science, art, and symmetry; and cut-and-paste topology. Assumes no more than high school algebra and geometry. Encourages students with diverse backgrounds to rediscover mathematics through individual projects, supplemental readings, and classroom discussions.

MTH 1188 Problem Solving and Pre-Calculus 1 6 QH
Develops basic algebraic and problem-solving skills in students who indicate these needs and are enrolled in this course rather than the four-credit MTH 1191. Together with MTH 1189, prepares the student for calculus (MTH 1193). Includes writing equations and relating word problems to equations, plotting linear equations, word problems involving algebraic fractions, algebraic operations, radicals, inequalities, functional notation and the graphing of functions.

MTH 1189 Problem Solving and Pre-Calculus 2 4 QH
Continues MTH 1188. Includes functions and graphing, composite functions and inverse functions, logarithmic and exponential functions and equations, trigonometric functions and their graphs, solving trigonometric problems, trigonometric identities, and vectors in two-dimensions.

MTH 1191 College Algebra 4 QH
Focuses on fundamental algebraic operations, complex numbers, radicals and exponents, functions, linear and quadratic equations, irrational equations, inequalities, variation, and roots of polynomial equations. *Prereq. Mathematics placement test or MTH 4082; BET majors only.*

MTH 1192 Pre-Calculus 4 QH
Focuses on logarithms, trigonometric functions of angles in degrees and radians, trigonometric identities and equations, right triangles, oblique triangles, complex numbers in trigonometric form, systems of equations, and determinants. *Prereq. MTH 1191 or MTH 4107; BET majors only.*

MTH 1193 Calculus I 4 QH
Focuses on plane analytic geometry; differentiation of algebraic functions; rate, motion, maximum and minimum problems; derivatives of higher order; curve sketching; basics in functions, limits, and continuity. (Not equivalent to MTH 1123.) *Prereq. MTH 1192 or MTH 4108; BET majors only.*

MTH 1194 Calculus 2 4 QH
Focuses on applications of derivatives to curve sketching; antidifferentiation; the definite integral, with applications; calculus of nonalgebraic functions—logarithmic, exponential, and trigonometric; calculus of inverse trigonometric functions; techniques of integration; indeterminate forms; and L'Hopital's rule. (Not equivalent to MTH 1124.) *Prereq. MTH 1193 or MTH 4120; BET majors only.*

MTH 1195 Calculus 3 4 QH
Focuses on polar coordinates, vectors in a plane, calculus of functions of several variables, partial differentiation, multiple integrals, infinite series, vector analysis, and introduction to differential equations. (Not equivalent to MTH 1125.) *Prereq. MTH 1194 or MTH 4121; BET majors only.*

MTH 1196 Differential Equations 4 QH
Focuses on ordinary differential equations—standard types of the first order, linear differential equations, especially with constant coefficients; Laplace transforms; series solutions of differential equations; and Fourier series and orthogonal functions. *Prereq. MTH 1195.*

MTH 1203 History of Mathematics 4 QH
Focuses on development of the various branches of mathematics, lives of outstanding mathematicians, growth of mathematical knowledge and its relation to culture. (III)

MTH 1212 Linear Programming 4 QH
Presents an introduction to concepts and techniques of linear programming, game theory, discrete modeling (shortest path, minimum spanning tree). Explores application to economics, social sciences,

and other related fields. (II) *Prereq. One year of college mathematics.*

MTH 1223 Calculus 4 4 QH
Covers partial derivatives and multiple integrals, with applications. *Prereq. MTH 1125.*

MTH 1225 Mathematical Analysis I 4 QH
Offers a study of ordinary differential equations for engineering students. *Prereq. MTH 1223 or equivalent.*

MTH 1226 Mathematical Analysis 4 QH
Focuses on numerical methods for solving ordinary differential equations, Fourier series, and selected partial differential equations by separation of variables. (Intended primarily for engineering students.) *Prereq. MTH 1225.*

MTH 1227 Calculus 4 4 QH
Focuses on solid analytical geometric, vector methods, parametrized curves, surfaces, partial differential with applications, and notions of linear algebra. *Only for students in the previous engineering curriculum.*

MTH 1228 Calculus 5 4 QH
Focuses on infinite series, Taylor series, convergence of power series, Fourier series, approximation methods, and various numerical techniques. *Only for students in the previous engineering curriculum.*

MTH 1233 Mathematical Models in the Life Sciences 4 QH
Focuses on the derivation and solution of mathematical models in biology, psychology, and the social sciences. May include such topics as population dynamics, diffusion processes, pollution control systems, neural networks, and mathematical genetics. *Prereq. One year of calculus.*

MTH 1237 Discrete Mathematics 2 4 QH
Covers elementary number and group theory. Examines fields, finite fields, coding theory, Hamming and BCH codes, counting arguments. *Prereq. MTH 1137 and MTH 1223.*

MTH 1238 Combinatorial Mathematics 4 QH
Provides a transition from calculus to more traditional mathematics courses. Explores various techniques for counting, such as permutations, combinations, inclusion-exclusion, Polya enumeration, and the mathematical formulations necessary for these techniques, including elementary group theory and equivalence relations. *Prereq. Two courses in calculus.*

MTH 1243 Calculus and Linear Methods I 4 QH
Focuses on methods of calculus and vector analysis to study curves, surfaces, and functions of several variables. Studies parameterization of lines and planes, tangents and normal vectors, partial derivatives, maxima and minima problems, linear approximations, and tangent planes. Some linear algebra. *Prereq. MTH 1145.*

MTH 1244 Calculus and Linear Methods 2 4 QH
Continues MTH 1243. Covers multiple integration, line integrals, and exact differentials; various forms of Stoke's theorem; and more linear algebra. *Prereq. MTH 1243.*

MTH 1245 Differential Equations and Linear Methods 1**4 QH**

Focuses on ordinary differential equations and linear algebra. Examines first-order equations, higher-order (primarily second-order) linear differential equations, systems of linear differential equations. Studies linear algebra, which includes eigenvalues and eigenvectors primarily for two-dimensional systems. Discusses applications of ordinary differential equations. *Prereq.* MTH 1145.

MTH 1246 Differential Equations and Linear Methods 2**4 QH**

Focuses on analysis of linear partial differential equations (wave equations, heat equation, and potential equation). Covers ordinary differential equations with boundary values, Fourier analysis, and orthogonal functions. Also considers numerical methods and other topics in ordinary differential equations. *Prereq.* MTH 1245.

MTH 1301 Linear Algebra 1**4 QH**

Focuses on vectors and vector spaces, including function spaces, subspaces. Examines lengths, angles, scalar products; volumes, determinants; linear independence and dependence, dimension, linear and affine maps, kernel and image. Studies algorithms: row operations, double triangular form, inversion. Introduces linear maps. Gives particular attention to characteristic polynomials, eigenvalues, and eigenvectors in low dimensions. *Prereq.* MTH 1244 or equiv. *Students who have not completed MTH 1143 through MTH 1246 should inform the course instructor.*

MTH 1302 Linear Algebra 2**4 QH**

Focuses on detailed study of linear maps. Studies symmetric maps and quadratic forms, isometries, skew-symmetric maps; decomposition of general linear maps using symmetric maps and isometries. Covers polynomials evaluated on linear maps, generalized eigenspaces, Jordan form. As time permits, introduces computational methods, with emphasis both on geometry underlying algorithms and on practical advantages and limitations. Surveys related areas in mathematics in which linear ideas play a role. *Prereq.* MTH 1301. *Upper-level students who have not completed MTH 1243 through MTH 1246 may take MTH 1301 and MTH 1302. Such students should inform the course instructor.*

MTH 1311 Analysis 1**4 QH**

Examines the theoretical foundations of calculus: limits, measure, continuity, and related concepts. With MTH 1312 serves as a bridge between the MTH 1243 through MTH 1246 calculus sequence and the more advanced analysis courses, such as MTH 1347, MTH 1348, MTH 1351, MTH 1370, and MTH 1371. *Prereq.* MTH 1246 or permission of instructor.

MTH 1312 Analysis 2**4 QH**

Continues MTH 1311. Focuses on calculus, applying the concepts introduced in MTH 1311. *Prereq.* MTH 1311.

MTH 1321 Introduction to Groups and Their Applications**4 QH**

Presents examples of groups (symmetry groups, permutation groups, matrix groups, cyclic groups) and their subgroups. Studies finite groups and orders of subgroups; homomorphisms and normal subgroups. Also considers applications to some of the following, depending on time and interest: geometry, number theory, crystallography, physics, and combinatorics.

MTH 1322 Topics in Rings, Fields, and Number Theory**4 QH**

Focuses on algebraic properties of the integers and rational, real, and complex numbers. Also covers commutative rings, ideals, integral domains, and other quotient fields; polynomial rings; quadratic extension fields; Gaussian integers; and other topics as time permits. *Prereq.* MTH 1321.

MTH 1327 Optimization and Mathematical Game Theory**4 QH**

Focuses on convex sets in Euclidean n -space, linear and nonlinear programming, zero-sum games, dynamic programming. Encourages students to program selected solution methods for a computer. *Prereq.* Some linear algebra, for example, MTH 1301, or permission of instructor.

MTH 1330 Number Theory**4 QH**

Introduces the elementary methods of analytic number theory. Focuses on divisibility, congruences, arithmetical and multiplicative functions, quadratic reciprocity, and equivalent formulations of the prime number theorem. *Prereq.* MTH 1301 or permission of instructor.

MTH 1337 Foundations of Mathematics**4 QH**

Studies the following topics and the shifts in perspective that their development brought about: the disputes over the basis for calculus, twentieth-century discoveries in mathematical logic, and the advent of the computer. (V)

MTH 1338 Foundations of Mathematics**4 QH**

Includes set theory, rules for set formation, the axiom of choice and its role in mathematics, transfinite cardinal and ordinal numbers and arithmetic, and axiomatizations of set theory.

MTH 1347 Applied Analysis**4 QH**

Demonstrates the application of mathematics to interesting physical and biological problems. Examines methods chosen from ordinary and partial differential equations, calculus of variations, Laplace transforms, singular perturbations, special functions, dimensional analysis, and other techniques of applied mathematics. *Prereq.* MTH 1246 or permission of instructor.

MTH 1348 Applied Analysis**4 QH**

Continues MTH 1347. *Prereq.* MTH 1347.

MTH 1349 Numerical Analysis 1**4 QH**

In practice, computations are never exact. Therefore, the problem of finding efficient methods to calculate sufficiently accurate answers is of fundamental importance. The emphasis of the course is not on recipes for solving problems, proving theorems, or

on writing computer programs. Rather, the practical concerns of efficiency and accuracy are illustrated by studying the following problems: roots of a non-linear equation, simultaneous linear equations, interpolation, and curve-fitting. *Prereq.* Two years of calculus and one course in programming.

MTH 1350 Numerical Analysis 2 4 QH

Analyzes problems in differential equations, integration, and ordinary differential equations. (Does not require prior knowledge of differential equations; MTH 1349 is not a prerequisite.) Emphasis is similar to that of MTH 1349. *Prereq.* Two years of calculus and one course in programming.

MTH 1351 Functions of a Complex Variable 1 4 QH

Focuses on algebra and geometry of complex numbers; concepts of limit, continuity, and derivative in the complex domain; holomorphic functions, series, contour integration; and applications. *Prereq.* MTH 1243 or equiv.

MTH 1352 Functions of a Complex Variable 2 4 QH

Continues MTH 1351. May include conformal mapping, analytic continuation, Riemann surfaces, the Laplace transform and inverse transform, elliptic functions, and applications. *Prereq.* MTH 1351.

MTH 1367 Geometry 4 QH

Provides a careful look at classical Euclidean geometry, Hilbert's axioms for geometry, and an extensive study of the basics of projective geometry. *Prereq.* Some basic linear algebra or permission of instructor.

MTH 1370 Recent Ideas in Geometry 4 QH

Presents some non-Euclidean geometry, especially hyperbolic and elliptic geometries. Topics include algebraic curves and surfaces. *Prereq.* MTH 1367 or permission of instructor.

MTH 1371 Recent Ideas in Geometry 4 QH

Continues MTH 1370. *Prereq.* MTH 1370.

MTH 1384 Probability for Engineering 4 QH

Discusses sample spaces; axioms of probability; random variables and their distributions; expectation, moments, and characteristic function; bivariate distributions; jointly Gaussian random variables; stochastic processes, including autocorrelation function and power spectral density; and estimation of the mean and autocorrelation function in the presence of noise. *Prereq.* MTH 1223 and MTH 1225 or equiv.

MTH 1387 Probability 1 4 QH

Focuses on probability functions for finite and infinite spaces; conditional probability and independence; discrete and continuous probability distributions for one or more random variables;

expectation; moments; binomial, Poisson, and normal distributions; and central limit theorem. *Prereq.* MTH 1223 or MTH 1244.

MTH 1388 Probability 2 4 QH

Studies selected topics, including introduction to stochastic processes, with emphasis on Poisson processes and Markov chains. *Prereq.* MTH 1384 or MTH 1387.

MTH 1390 Mathematical Statistics 4 QH

Focuses on estimation of parameters, confidence intervals, hypothesis testing, regression, sampling distributions. Introduces analysis of variance and statistical decision theory. *Prereq.* MTH 1384 or MTH 1387.

MTH 1392 Multivariate Statistics 4 QH

Examines methods of classification, estimation, and prediction based on several statistical variables. *Prereq.* MTH 1390.

MTH 1714, MTH 1723, MTH 1724, MTH 1725, 4 QH each

MTH 1733, MTH 1734, MTH 1735, MTH 1743,

MTH 1744, MTH 1745, and MTH 1746 Honors Program

Special sections for honors students of courses MTH 1114, MTH 1123, MTH 1124, MTH 1125, MTH 1133, MTH 1134, MTH 1135, MTH 1143, MTH 1144, MTH 1145, and MTH 1243 respectively.

MTH 1763 Introduction to Computers (Honors) 4 QH

Honors equivalent of MTH 1163.

MTH 1801–MTH 1808 Directed Study 4 QH

Gives highly motivated students the opportunity to explore mathematical situations and theories in depth. Can be used as an opportunity to examine familiar material in fresh ways or to explore new material not offered in formal courses. Provides students strong in mathematics and the related sciences a chance to develop the art and skill needed to work independently and creatively in mathematics. *Prereq.* Permission of instructor. Students strong in mathematics are permitted to enroll in graduate mathematics courses.

MTH 1809 Directed Study: Problem Solving 4 QH

Emphasizes mathematical problem-solving techniques from a range of areas, including but not limited to integration, differentiation, number theory, group theory, field theory, combinatorics, linear algebra, differential equations, and mathematical modeling. The mathematical model aspect constitutes one third to one half of the course. Analyzes specific real-world models in complete detail, including running and analyzing computer simulations. Requires students to make a number of presentations to the class demonstrating specific techniques. *Prereq.* Permission of instructor.

Music

Some courses in the College of Arts and Sciences are duplicated in different departments or colleges or within a department. You may not receive credit for two such courses. If you have a question about whether one course overlaps another, please consult the departments involved and the Office of the Dean before you take the course.

Numbers inside parentheses within course descriptions refer to core curriculum categories listed on page 2.

MUS 1100 Introduction to Music

4 QH

Offers an introduction to selected works of our Western musical heritage, from earliest to contemporary styles. Consists primarily of a survey and listening format, with emphasis on styles, basic theory, forms, and the historical, social, and artistic periods that these works represent. (II)

MUS 1101 Music as a Listening Experience

4 QH

This introductory course is listening-oriented and has been designed to provide tools for the aural appreciation of musical forms. No previous musical knowledge is required or assumed, and studies deal directly with compositions selected from the masterpieces of music. Organized according to the tenets of PSI (Personalized System of Instruction), the course allows students to proceed at their own pace under the constant guidance and supervision of the instructor. Grades are determined by the number of units completed. Students are expected to meet with the instructor before the beginning of the course. (II)

MUS 1102 Music in Concert

4 QH

Gives students the opportunity to develop musical understanding through the study of music currently performed in concerts by major symphony orchestras in the United States and throughout the world. Selects study materials from symphony concert programs.

MUS 1103 Music as a Social Expression

4 QH

Examines the processes of music-making and the perceptions of music's functions in our culture. Considers how music is made, what music means, what kind of music is made, and what music is made to be meaningful. Identifies styles and genres of music and examines them within an ever-shifting context of aesthetics, social history, and cultural change. (III)

MUS 1104 Survey of African-American Musics

4 QH

Explores the various musical traditions of African-Americans, with a specific focus on the United States. Examines the impact of African, European, and Native American traditions on African-American music as well as the role of music as an expression of African-American aesthetics, traditions, and life. Considers historical and contemporary forms of African-American musics, with selected video presentations of musical styles.

MUS 1105 Music of the U.S.A.

4 QH

Examines American music from the time of Puritan psalm singing to the present. Covers a wide variety of music, including concert music, traditional folk music, jazz, and contemporary styles. (V)

MUS 1106 Women in Music

4 QH

Examines the multi-faceted role of women in music from the Renaissance through to the present. Discusses the fact that for centuries women have been active and influential patrons, composers, teachers, conductors, and performers in Europe and America. Examines their contributions to classical and popular music and to jazz, with emphasis on such widely varying figures as Elizabeth Jacquet de la Guerre, Fanny Mendelssohn Hensel, Clara Schumann, Amy Beach, Germaine Tailleferre, Billie Holiday, Carla Bley, Ruth Crawford Seeger, Pauline Oliveros, Sarah Caldwell, Antonia Brico, and Nadia Boulanger.

MUS 1107 Principles of Music Literature

4 QH

Examines the evolution of each major structural element of music through a historical perspective. Also, attempts to link larger categories of music such as classical, popular, and non-Western by examining their common elements. Required of all music majors. *Prereq. Permission of instructor.*

MUS 1109 Introduction to Music and the Arts

4 QH

Offers an interdisciplinary approach to music and other arts including painting, film, and theater. Examines works of art from various periods in the context of the cultures that produced them. Supplements regular classes with visits to art museums or attendance at concerts and theatrical performances. (II)

MUS 1110 Music in Popular Culture

4 QH

Deals with the nature of music composed for the mass market. Discusses techniques of recording and merchandising music and selected songs analyzes for their musical content. Traces the evolution of various styles, including ragtime, jazz, blues, rock, and music for the media.

MUS 1111 Rock Music

4 QH

Examines the development of rock'n'roll and its relationship to blues, rhythm and blues, country, folk, and other styles of music. Considers themes such as the role of rock as youth music, the reflections of social realities in rock songs, the relationship of rock to the recording industry and the mass media, and the changing styles of rock. Emphasizes listening skills.

MUS 1112 Jazz

4 QH

Examines the historical development of jazz music from its African-American roots to its current status as one of America's classical musics and an internationally valued art form. Devotes attention to the contributions of African musical traditions, including spirituals, work songs, and the blues. Examines

the impact of major contributors such as Eubie Blake, Ma Rainey, Louis Armstrong, Duke Ellington, Charles Parker, Miles Davis, John Coltrane, and Wynton Marsalis. Examines the functional role of jazz as a means of expression in African-American culture.

MUS 1120 Topics in Music History 4 QH

Provides a chronological view of Western music, while examining the role of music in society and exploring the contributions of influential composers. Discusses representative works from each period, including music by composers such as Machaut, Josquin, Bach, Handel, Mozart, Haydn, Beethoven, Berlioz, Wagner, Mahler, and Stravinsky. (III) *Prereq.* MUS 1201.

MUS 1121 Medieval and Renaissance Music 4 QH

Offers an introduction to European music from the sixth through the sixteenth centuries. Covers a wide variety of music, ranging from the serene elegance of sacred Gregorian chant and the plaintive love songs of the medieval troubadours to the lively dances and humanistic vocal music of the Renaissance. Examines representative works by composers such as Machaut, Landini, Josquin, Palestrina, and Dowland.

MUS 1122 Music of the Baroque Era 4 QH

Focuses on music of the seventeenth and early eighteenth centuries in Italy, Germany, France, and England. Discusses the emergence of important new genres (such as opera, sonata, and concerto) and examines representative works of major composers (such as Bach, Handel, Corelli, Vivaldi, Rameau, and Purcell).

MUS 1123 Music of the Classical Era 4 QH

Focuses on crucial developments in musical styles and forms of the late eighteenth century and on emerging genres, such as the symphony, the concerto, and the string quartet. Emphasizes the vocal and instrumental works of Haydn and Mozart and on the early works of Beethoven.

MUS 1124 Music of the Romantic Era 4 QH

Focuses on romantic realism and idealism as expressed in the music of the nineteenth century. Emphasizes historical, nationalistic, and literary influences. Includes composers such as Beethoven, Schumann, Schubert, Berlioz, Liszt, Verdi, Wagner, Brahms, Tchaikovsky, and Mahler. (V)

MUS 1125 Twentieth-Century Music 4 QH

Focuses on developments in music from 1900 to the present. Examines a broad range of musical styles, including expressionism, neo-classicism, and other major trends in music of the twentieth century. (V)

MUS 1126 New Directions in Music 4 QH

Recognizes that music from 1950 to the present has changed more radically than during any other era in history. Examines new elements in classical and popular music and focuses on the relationship between the two styles.

MUS 1130 The Symphony 4 QH

Studies the symphony as a major genre in the classical, romantic, and contemporary periods. Includes works by composers such as Haydn, Mozart,

Beethoven, Schumann, Tchaikovsky, Brahms, Sibelius, and Prokofiev.

MUS 1131 Piano Music: The Great Composers and Performers 4 QH

Gives students the opportunity to hear and analyze some of the greatest works for piano, performed by some of the world's greatest performers. In addition to recordings by internationally acclaimed artists, presents live performances by guest artists from the Boston area.

MUS 1132 Introduction to Opera 4 QH

Offers an analysis of opera as a dramatic genre. Isolates and discusses aria, recitative, ensemble, and other basic elements of opera. Considers number opera, music drama, and Singspiel types of opera. Includes composers such as Mozart, Wagner, Verdi, and Puccini.

MUS 1133 Great Choral Literature 4 QH

Analyzes sacred and secular choral literature from medieval to contemporary times.

MUS 1134 Music and Poetry 4 QH

Examines the art of setting words to music. Confronts the aesthetic problems encountered in a synthesis of two different art forms. Examines that synthesis in selected songs, choral works, tone poems, and operas of diverse periods and styles (classical, folk, and popular). (III)

MUS 1135 Traditional Folk Music of the United States 4 QH

Focuses on the major folk music traditions of North America and their origins in Europe and Africa. Emphasizes related ethnic dances, epics, and rituals.

MUS 1139 Film Music 4 QH

Surveys the use of music in film and video and gives an overview of the mechanics of synchronization and the psychological implications of applying music to film. Analyzes specific dramatic situations, followed by discussion of such scoring techniques as click tracks and picture recording. Studies films such as *The Informer*, *Alexander Nevsky*, *Citizen Kane*, *Forbidden Planet*, *Woman in the Dunes*, and *Tron*. Discusses the works and careers of specific film composers such as David Raskin, Aaron Copland, Jerry Goldsmith, Sergei Prokofiev, and John Williams.

MUS 1140 Mozart 4 QH

Traces Mozart's musical development from child prodigy to mature artist through personal letters and biographies. Analyzes many of his major compositions, including symphonies, concertos, operas, and chamber works.

MUS 1142 Stravinsky 4 QH

Focuses on the life and works of Igor Stravinsky, the man who has been perhaps the most influential of all twentieth-century composers. Selects important works (such as *The Rite of Spring*, *Symphony of Psalms*, *The Rake's Progress*, and *Agon*) from each of his major stylistic periods and assesses his contributions to twentieth-century musical style.

MUS 1144 Debussy and the Music of Paris**4 QH**

Recognizes that Claude Debussy, impressionist in sound, composed music that marked a turning point toward modern trends. Covers much of his music for piano, orchestra, and voice, including *Suite Pour le Piano*, *Suite Bergamasque*, *Images* (for piano and orchestra), *Nocturnes*, *La Mer*, and *Pelleas et Melisande*. Discusses the music of Satie, Ravel, and Faure as it relates to that of Debussy.

MUS 1145 Beethoven**4 QH**

Analyzes the complex personality and art of Beethoven, his relation to the turbulent times in which he lived, and his role in classical and romantic music. (III)

MUS 1146 George Gershwin**4 QH**

Studies the life and works of George Gershwin (1898–1937), including popular song, musical comedy, opera, and orchestral compositions. Explores the relationship of George Gershwin to his times, both musically and historically. Takes as a critical starting point Gershwin's famous statement, "My people are American; my time is today."

MUS 1161 Music Therapy 1**4 QH**

Examines the application of music as a therapeutic vehicle to release suppressed emotions, to encourage self-expression in psychiatric patients, and to treat a wide variety of disorders. Examines music therapy, in a modern approach to health services, as a supplement to other treatments.

MUS 1162 Music Therapy 2**4 QH**

Examines the etiologies, characteristics, and applications of music therapy with the physically handicapped, hearing impaired, visually impaired, learning disabled, emotionally disturbed, speech/language impaired, and geriatric populations in one-to-one and group settings. In addition, studies improvisations and appropriate music materials for the nonmusician and adapted instrument designs tailored to each disability, while exploring the correlation of music and movement. Compares various musical therapy approaches; includes field trips to musical therapy sites in and around Boston. *Prereq.* MUS 1161.

MUS 1163 Sound Health**4 QH**

Gives both musicians and non-musicians the opportunity to experience a heightened awareness of the power of music to effect physical and emotional change. Examines the effects of music on the body, mind, and spirit. Begins with an exploration into the awareness of sound and the physiological changes in the body caused by music, and moves through a variety of theories and techniques used to facilitate positive change, relaxation, and reduction of stress. Also considers sound pollution, the effects of vibrations on the body, guided imagery, music and meditation, and new-age environmental music.

MUS 1165 The Music Industry 1**4 QH**

Examines business-related areas of the music industry. Includes topics such as the make-up and structure of the record industry and music publishing

world, the function of performing rights organizations (ASCAP and BMI), and the role of concert and orchestral managers. Includes guests from the various fields who will be invited to lecture in class and trips to "behind the scenes" locations.

MUS 1166 The Music Industry 2**4 QH**

Continues MUS 1165. Covers such topics as artist management, theatrical production, concert promotion, and royalties and contracts. Requires students to undertake case studies of local musical organizations, both on and off campus.

MUS 1167 Music Management**4 QH**

Introduces music management, including the structure of nonprofit organizations (such as arts service organizations, arts centers, symphony orchestras, chamber orchestras, ensembles, opera companies, and university arts programs) and the structure of profit enterprises. Examines financial management, funding, and audience development.

MUS 1170 Music and Technology**4 QH**

Studies the applications of contemporary technology to music. Discusses basic acoustics, analog and digital recording techniques, computer sound synthesis, and the aesthetics of electronic music. Requires no prerequisites in physics or music theory; however, takes into consideration the particular backgrounds of individual students for projects and papers.

MUS 1172 Introduction to Music Recording**4 QH**

Introduces the history and practice of recording music. Covers recording apparatus; microphones; monophonic, stereophonic, and digital theory and techniques; field recording; studio terminology; basic sound theory; and development of rudimentary editing skills. Also examines the role of the producer versus that of the technician, preparation for recording sessions, and basic legal regulations regarding copyrights and compensation.

MUS 1180 Introduction to World Music**4 QH**

Introduces musical traditions from around the world using ethnomusicological approaches to examine the role of music in culture. Focuses on various world musics from the perspectives of the people who create the music and compares these perspectives with our own.

MUS 1181 Musics of Africa**4 QH**

The musics of Africa are as varied as that continent's many linguistic and cultural groups. The course surveys various African musical traditions with respect to their historical, social, and cultural heritage. The course examines traditional and contemporary African musics, instruments, and performance traditions.

MUS 1182 Music of the Middle East**4 QH**

Presents an introduction to the music of selected Near Eastern and Arab cultures (such as Persian in the East and Ethiopic and Berber in Africa). Includes the cantillation styles and practices of various chants of the Hebrew, Christian, and Islamic traditions.

MUS 1183 Music of East Asia**4 QH**

Introduces the student to the musical heritage of East Asia by examining music history, the relationship of music cultures to each other, the organization of musical sounds, and music as an aspect of culture. Emphasizes development of basic listening skills.

MUS 1184 Music of Latin America and the Caribbean**4 QH**

Examines the highly diverse and unique musical practices of Latin America and the Caribbean. Emphasizes music's role as an adjunct to religious and social practices, as well as how it has been influenced by European, Native American, and African music.

MUS 1200 Learning to Read and Write Music**4 QH**

Provides basic instruction for those who want to learn how to read music or how to write a tune. Gives students the opportunity to learn to sight-read music and to compose in some of the basic forms (song, theme and variation, etc.). Credit given for either MUS 1200 or MUS 1201, but not both because they include overlapping material.

MUS 1201 Fundamentals—Music Theory I**4 QH**

Offers the student the opportunity to learn simple melodic and rhythmic dictation skills; to recognize and build scales, intervals, and triads; and to sing at sight simple tonal melodies. Requires a noncredit, ear-training lab. (II)

MUS 1202 Music Theory 2**4 QH**

Focuses on harmonic practices in tonal music. Examines the role and function of harmony through analysis of musical examples and composition of four-voice chorales. Requires a noncredit, ear-training lab. *Prereq.* MUS 1201.

MUS 1203 Music Theory 3**4 QH**

Continues MUS 1202 and focuses on aspects of chromatic harmony. Discusses the construction and function of borrowed chords, altered chords, and non-diatonic harmony. Requires a noncredit, ear-training lab. *Prereq.* MUS 1202.

MUS 1204 Music Theory 4**4 QH**

Introduces the student to methods of musical analysis. Examines phrasing, periodicity, tension-repose, and other structural factors of musical compositions. Requires a noncredit, ear-training lab. *Prereq.* MUS 1203.

MUS 1209 Functional Piano**4 QH**

Gives students the opportunity to develop the keyboard skills appropriate for an undergraduate concentration in music. Studies realization of a figured bass, the harmonization of a melodic line, simple score reading (including treble, bass, alto, and tenor clefs), transposition, sight-reading, and the ability to play any of the major or minor scales. *Prereq.* MUS 1202.

MUS 1210 Music Theory Lab**1 QH**

Provides both group and individual instruction in ear training, sight-singing, and keyboard skills. This lab can be taken only in conjunction with the department's music theory courses (MUS 1201, MUS 1203, MUS 1204). May be repeated for credit.

MUS 1211 Sight-singing**4 QH**

Offers students the opportunity to learn how to read music at sight without the aid of a musical instrument, an essential skill for every musician. Emphasizes mastery of the skills of rhythm reading, as well as *solfege* and triad recognition in all diatonic keys, through class instruction and daily practice. Requires knowledge of the fundamentals of musical notation. *Prereq.* MUS 1201 or equivalent.

MUS 1230 Chorus**1 QH**

Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor. May be repeated for credit. *Prereq.* *Permission of instructor.*

MUS 1231 Band**1 QH**

Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor. May be repeated for credit. *Prereq.* *Permission of instructor.*

MUS 1232 Chamber Ensembles and Orchestra**1 QH**

Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor. May be repeated for credit. *Prereq.* *Permission of instructor.*

MUS 1233 Early Music Players**1 QH**

Allows students to participate as performers in one or more ensembles under the direction of a faculty coach. May be repeated for credit. *Prereq.* *Permission of instructor.*

MUS 1240 Historical Instruments Workshop**4 QH**

Provides instruction for those who wish to learn to play a medieval, Renaissance, or baroque instrument. In addition to teaching basic skills on instruments such as recorder, flute, crumhorn, viola da gamba, vielle, cornetto, and harpsichord, provides opportunities for developing proficiency in music reading and ensemble playing.

MUS 1241 Piano Class 1**4 QH**

Provides introductory-level study of piano designed for students with or without previous experience. Combines skills in reading music with improvisation and functional piano. Introduces some basic theory to help clarify the structure of class repertoire. Allows students to progress at their own pace. Determines grades by the amount of repertoire mastered during the quarter.

MUS 1242 Piano Class 2**4 QH**

Continues the skills developed in MUS 1241, with emphasis on increasing students' flexibility at the keyboard through the study of scales, transposition, and modulation. *Prereq.* MUS 1241.

MUS 1244 Voice Class 1**4 QH**

Gives students the opportunity to learn the basic vocal production required for fine singing. Chooses repertoire, both classical and contemporary, for each student to learn and perform in lessons and before the entire class. Covers the following subjects: diction, the physiology of singing, resonance, registers, and interpretation. Also studies the basics of music

reading and sight-singing. Discusses some interpretation and plays recordings of the greatest vocal artists for class analysis. *Prereq.* *Permission of instructor.*

MUS 1247 Guitar Class 1 **4 QH**

Provides an introduction to the fundamentals of classical guitar playing for those with or without prior knowledge of the guitar. Covers music reading and theory. Requires students to perform alone and in ensemble with other members of the class. Augments the syllabus by live performances from outside professional and student classical guitarists. Bases final grades on several written examinations and student performance.

MUS 1250 Conducting **4 QH**

Provides instruction in the basic gestures used in conducting vocal and instrumental ensembles. Topics include beat patterns, conveying phrasing and articulation, cueing, controlling tempo and dynamics, score study, and rehearsal techniques. Provides an opportunity for students enrolled in the course to constitute a laboratory ensemble for regular practicum. *Prereq.* *Ability to read music and to sing or play an instrument.*

MUS 1261 Music Lessons **1 QH**

Offers private instruction in voice or in an instrument. Arranges lessons on a half-hour or 45-minute basis. Contact the music department for arrangements. Lab fee.

MUS 1265 Jazz Improvisation 1 **4 QH**

Focuses on repertory as well as performance. Examines the great improvisational artists in American music, such as Charlie Parker, Miles Davis, and John Coltrane. Approaches analysis from a theoretical as well as a practical perspective. Explores the use of rhythm, chords, scales, and modes in the creative improvisation process.

MUS 1301 Form and Analysis 1 **4 QH**

Examines representative examples of structural principles governing the melodic, harmonic, rhythmic, and formal components of music. Focuses on music from the sixteenth to the mid-nineteenth centuries. *Prereq.* *MUS 1204.*

MUS 1302 Form and Analysis 2 **4 QH**

Continues MUS 1301. Examines works from the late nineteenth century to the present. Includes selected readings by prominent twentieth-century theorists. *Prereq.* *MUS 1301.*

MUS 1461 Applied Music Lessons **3 QH**

Provides advanced individual instruction in voice or on modern and early instruments. May be repeated for credit. Available only to upperclass students concentrating in music literature and performance. *Prereq.* *Permission of instructor and department chair.*

MUS 1700 Introduction to Music (Honors) **4 QH**

Honors equivalent of MUS 1100.

MUS 1709 Introduction to Music and the Arts (Honors) **4 QH**

Honors equivalent of MUS 1109.

MUS 1800, MUS 1801, MUS 1802, MUS 1803, MUS 1804, MUS 1805 Directed Study **4 QH each**

Focuses independent work in a selected area of music under the direction of one member of the department. Limits enrollment to qualified students by special arrangement with the supervising faculty member and with the approval of the department chair.

MUS 1810, MUS 1811, MUS 1812 Junior/Senior Honors Program **4 QH each**

For details, contact the Honors Office, 183 Holmes.

INT 1110 American Musical Theatre **4 QH**

Traces the development of the American musical from works such as *The Black Crook* to the present. Considers the role of musical theater as both entertainment and serious art form through an examination of script, score, dance, and design. Studies works by composers and lyricists such as Bernstein, Rodgers and Hammerstein, the Gershwins, Weill, Lerner and Loewe, and Cole Porter.

Courses at the New England Conservatory

A limited number of qualified students will be able to take selected courses at the New England Conservatory of Music. Regular academic credit will be granted. For information, contact the chair of the department.

Philosophy and Religion

Some courses in the College of Arts and Sciences are duplicated in different departments or colleges or within a department. You may not receive credit for two such courses. If you have a question about whether one course overlaps another, please consult the departments involved and the Office of the Dean before taking the course.

Numbers inside parentheses within course descriptions refer to core curriculum categories listed on page 2.

PHL 1100 Introduction to Philosophy 4 QH

Introduces students to philosophy by acquainting them with the theories and arguments of classical and contemporary philosophers and by teaching the skills of constructing and analyzing arguments. Emphasizes philosophical inquiry. Covers typical areas such as questions about the basis of morality, free will versus determinism, the existence of God, the problem of suffering, and the nature of knowledge. (II)

PHL 1110 Introduction to Religion 4 QH

Seeks to identify and appraise different ways of being religious: primitive, mystical, dogmatic, and ritual. Emphasizes appreciating the unique standpoint that each requires, how each sees the world in a radically different way, and how that leads to distinctive ways of life. (II)

PHL 1115 Understanding Religious Man 4 QH

Examines several important explanations of the nature, origin, and present significance of religious experience, beliefs, and practices in the light of modern knowledge and attitudes.

PHL 1130 Ethics: East and West 4 QH

Is there a best way to live? Is there a way a human being should live? In both Eastern and Western philosophy there are claims that a way of life exists that leads to happiness, power, and wisdom. This course explores this claim by studying the thought of such philosophers as Socrates, Buddha, Plato, Aristotle, Lao Tzu, Epictetus, Marcus Aurelius, Aquinas, and Spinoza, as well as by studying some of the classical Hindu and Buddhist texts. (V)

PHL 1135 Philosophical Problems of Law and Justice 4 QH

Focuses on two general questions: What is the proper scope of the law? And how should the law be enforced? Under the first question, deals with a number of issues such as whether the law has a legitimate right to restrict such activities as the use of drugs, deviant sexual practices, or gambling. Under the second question deals with the justification of punishment, rehabilitation as an alternative to punishment, and the death penalty. (VI)

PHL 1140 Social and Political Philosophy 4 QH

Focuses on basic questions about the nature of the state and the relationship of individuals to the state. What basis is there for individuals to obey the laws of the state? What conditions must a government meet to be legitimate? What justification can be given for democratic forms of government? What sorts of controls should the state exert over citizens?

What benefits do citizens have a right to expect from the state? Includes readings from both classical and contemporary sources. (V) *Prereq.* 4 QH philosophy.

PHL 1145 Technology and Human Values 4 QH

Examines the changing values of the modern, technologically advanced world. Attempts to increase our understanding of the supposed breach between the literary and scientific cultures, the diverse approaches toward their reconciliation, and the human dimensions of science and technology. Considers other relevant topics such as the neutrality of technology with respect to good or evil uses, technology as an instrument for human liberation, and the issue of proper and effective modes of controlling technology in today's world. Studies Pirsig's widely read paperback, *Zen and the Art of Motorcycle Maintenance*, as well as Lynn White's *Dynamo and Virgin Reconsidered*. Also considers other important writers, including Kurt Baler, Jacob Bronowski, Barry Commoner, Erich Fromm, Karl Marx, and C. P. Snow. (VI)

PHL 1150 Technology and the Individual 4 QH

Attempts to awaken some philosophical reflectiveness regarding the potential benefits and threats to individuals that derive from technological change. Explores such issues as the relation of technology to human freedom and privacy; the effects of "future shock" on the individual; the possibility of the tyranny of a technological elite; and the prospects for the transformation of humankind. Discusses writers who see technology as the salvation of humanity; writers who see technology leading to dehumanization, a decrease of freedom, and a developing sense of alienation; and still other writers who see the extinction of "human nature" as we once knew it. Where is the truth in all of this? What are the social, psychological, and philosophical meanings and consequences of technological change in our day and in the future? Includes major readings from Alvin Toffler's *Future Shock*, Herbert Marcuse's *One Dimensional Man*, Jacques Ellul's important criticism *The Technological Society*, and Lewis Mumford's *The Transformation of Man*.

PHL 1155 The Ethics of Human and Animal Experimentation 4 QH

Explores the conflicts that arise between the value of free scientific inquiry on the one hand and the rights, vulnerabilities, and suffering of human and animal subjects on the other. Considers traditional issues involving informed consent, voluntariness, coercion, experimental design, risk-benefit analyses,

institutional review boards, and professional guidelines, as well as such less traditional issues as the competing conceptions of progress, whether we have obligations to nonhuman animals, and what, if anything, justifies us in treating animals in ways in which we know we should not treat humans. (VI)

PHL 1160 Ethical Issues of Taxation **4 QH**

Although we tend to believe that persons have a right to their own labor, a right to their own property, and a right to exchange their labor or property for the labor or property of other consenting adults, it seems that income taxes, property taxes, and sales taxes violate these rights. This course explores two basic questions: Is any taxation morally justified? Are there moral grounds for choosing among taxation policies? Specific topics include competing conceptions of private property; the "progressive versus regressive taxation" controversy; the "flat tax" controversy; the alleged problems with interpersonal utility comparisons; and questions involving the distribution of tax monies, e.g., whether those who have more than they need have any moral obligation to provide for the needs of the poor. (VI)

PHL 1165 Moral Problems in Medicine **4 QH**

Examines two fundamental ethical systems, one of which is grounded on the dignity of the person, the other on the intrinsic value of happiness. Then explores the difficult issues of euthanasia, suicide, paternalism, medical experimentation, the patient's right to consent to any therapeutic intervention, and the concept of death with dignity. Examines the larger economic and policy issues of justice, some of which are current in political debates (for example: Is there a right to health care?). Encourages the student to become more sensitive to moral problems as they arise in medical settings, to be better able to deal with these troublesome issues, and perhaps to be more courageous in facing them if that becomes necessary. Also offers an investigation into the questions of abortion, euthanasia, infanticide, genetic counseling, psychosurgery, and human experimentation from the standpoint of both philosophical ethics (such as the theory of the end justifying the means) and religious ethics (such as the natural-law theory of the Roman Catholic Church). (VI)

PHL 1180 Ecology Ethics **4 QH**

Investigates the Gaia hypothesis, the view that the earth is a self-regulating ecosystem. Focuses on a current ecological crisis, the greenhouse effect, and on one of its major causes, deforestation. Addresses the values that underlie our concern over this and other ecological crises, whether the values at issue are anthropocentric or biocentric. Explores the ethical implications these ecological concerns have for our individual lifestyles, and for our role as members of communities. Explores how we should live as creative, responsible, and fulfilled beings on the planet.

PHL 1200 Introduction to Logic I* **4 QH**

Introduces the logic of propositions and the syllogism. Examines principles of critical reasoning and fallacies. Provides practice in applying logical techniques to the creation and criticism of argument. (II)

PHL 1203 Introduction to Logic 2*

4 QH

Further studies the techniques of logic in the analysis and creation of argument. Explores the logic of predicates, quantifiers, and relations. Provides practice in applying these techniques to natural arguments. Considers the forms of definition and the evaluation of empirical generalizations. (Overlaps PHL 1215.) (II)

PHL 1215 Symbolic Logic*

4 QH

Focuses on the syntax and semantics of propositional logic and first order quantification theory. Considers relations between these systems and natural language. Covers analysis of the notion of derivation within a system, the notion of logical consequence, and practice in analyzing logical structure in natural language sentences. (II)

PHL 1225 Ancient Philosophy

4 QH

Explores classical Greek philosophy; starts with a study/discussion of the roots of Western thought in the sixth century B.C. and argues the reasons for our debt to these original thinkers who were concerned with explaining the principles of external nature and the problems of human knowledge and conduct. Studies Socrates and his adversaries, the Sophists, and the two major figures he influenced: Plato and Aristotle. Also covers Roman philosophy, the Stoics, and the Sceptics, who are a prelude to the early Christian philosophers of the first century A.D. Places attention on the interplay between philosophers and the moral, social, and religious context in which their thought arises. Emphasizes student participation in class discussion. (III)

PHL 1230 Modern Philosophy

4 QH

The 100 years between 1650 and 1750, sometimes called "the century of genius," were a period in which philosophers reacted to the new scientific discoveries of Copernicus, Kepler, and Galileo. Out of this reaction came new ways of thinking about the nature of knowledge and the nature of the world itself. The course focuses on the development of the rationalist and empirical philosophies during this period, with emphasis on Descartes, Leibniz, Spinoza, Locke, Berkeley, and Hume. (III) *Prereq.* 8 QH philosophy.

PHL 1243 Existentialism

4 QH

Examines existentialist philosophy in its greatest representatives, such as Kierkegaard, Nietzsche, Dostoevski, Heidegger, Jaspers, and Camus, with major attention given to Jean-Paul Sartre and Maurice Merleau-Ponty. Focuses on central themes, including self-alienation, unauthenticity, authenticity, and existential experiences. Examines existential philosophy in its historical, social, and cultural relations, and in its influence on psychology, psychoanalysis, sociology, political science, and literature, both in Europe and in the United States. *Prereq.* 4 QH philosophy.

PHL 1245 Analytic Philosophy

4 QH

Traces the development of the analytic movement from its beginnings in the early works of Moore and Russell. Provides some treatment of Russell's logical

*Students should take either PHL 1200 and PHL 1203 or PHL 1200 and PHL 1215. Credit will not be given for all three courses.

atomism, the logical positivists, the thought of Ludwig Wittgenstein, and their widespread influence. *Prereq.* 8 QH *philosophy*.

PHL 1250 Chinese Philosophy

4 QH

Examines Chinese philosophy in the ancient period (until 221 B.C.). Emphasizes Confucianism, Taoism, and the *I Ching*. Also covers the Logicians, the Mohists, and the Legalists.

PHL 1255 Indian Philosophy

4 QH

Examines the two classical Indian philosophical systems of Hinduism and Buddhism. In examining Theravada Buddhism, explores the view that it is possible for us to live without anxiety or suffering if we overcome our ignorance of reality and master our desires. Next, explores Mahayana Buddhism and its ethics of compassion and its related metaphysics of "voidness." In this part of the course, examines questions that, in the West, are thought of as questions about personal identity and the nature of the self. In exploring Hinduism, studies Vedic mysticism as it comes to us through the Upanishads, as well as the influential ethics of the Bhagavad Gita. Examines the question of whether the method of yoga and meditation is a reasonable method for learning about the fundamental nature of reality.

Using the classical texts of these systems, critically explores the techniques employed within these traditions: the method of yoga, the function of the guru, various methods of meditation, the point of nonviolence, the function of philosophical analysis, and the role of the austerities. Studies Hinduism as it is currently practiced in India, Theravada Buddhism as it is currently practiced in Sri Lanka and Thailand, the Tibetan tradition of Mahayana Buddhism, and the nonviolence of Gandhi.

Emphasizes that to study Indian philosophy is to study a tradition of philosophy in which ethics is not fragmented from epistemology, knowledge is more than justified true belief, and one's metaphysics is to be realized. Besides the classical texts, employs films and guest speakers. (IV)

PHL 1265 American Religions

4 QH

Approaches the American religious tradition from three perspectives. First, examines the transplanted and transformed European traditions in the context of American diversity and pluralism, especially the Protestant, Roman Catholic, and Jewish traditions. Second, looks into the rise and establishment of largely indigenous religious groups who have forged their own foundations in the midst of the older traditions, including the Mormons, the Hutterites, the Mennonites, the perfectionist groups (such as the older Oneida Community and the Shakers, and the more recent "cults"), and the black and Native American groups. Third, explores the theory of an American civil religion—the notion that there is a general religious meaning for American culture that makes the coexistence of the many religious groups possible and gives to that culture and its history a religious significance. Encourages students to achieve an understanding of what is unique and viable in the American religious tradition. (III)

PHL 1270 Western Religions

4 QH

Western religion is grounded in the experience of God's presence, which transcends and transfigures the life of the individual and the community. This encounter is the essence of Judaism, Christianity, and Islam. Drawing on autobiography and biography, this course delves into the personal religious quests of such major religious thinkers as St. Augustine, St. Theresa, Martin Luther, Elie Wiesel, Richard Rubenstein, Dietrich Bonhoeffer, and Mohammed.

PHL 1275 Eastern Religions

4 QH

Eastern religions appear to be fundamentally different from the orthodox religions of the West. Not only do Hinduism, Buddhism, and Taoism promise a solution to the problem of suffering (compare the common Christian and Jewish attitudes), but most of these religions do not have a central God personality, and some explicitly reject such a concept as meaningless or at least as irrelevant to leading a religious life. Central to these views is a way of being in the world that emphasizes meditation, skillful and compassionate action, and a direct awareness of the fundamental nature of reality. The course first tries to make sense of the difficult notion that the way we perceive reality may be illusory. It then examines Theravada Buddhism, a religion that rests on the insights that everything is impermanent and that it is possible to live fully in the present without any suffering. From Theravada Buddhism, the course turns to Mahayana Buddhism, and then to Taoism, a subtle view that emphasizes the "flow" of life and that "the way to do is to be." Next, the Hinduism of the Upanishads is examined. As part of the exploration of this form of Hinduism, students are given the opportunity to examine meditation intellectually and also to practice a few methods of meditation. In addition, the course investigates the devotional aspect of Hinduism as expressed in the Bhagavad Gita. There will also be an exploration of Zen. (IV)

PHL 1280 Islam

4 QH

Explores the history of Islam, its past and current conflicts with the West, Islamic beliefs, the future of Islam as a world religion, and relations of Islam with Christianity and Judaism. Examines social, political, and legal issues, as well as with the more familiar religious and theological questions. (IV)

PHL 1290 Cults and Sects

4 QH

Examines the varieties of religious experience from the perspectives of sociology and psychology of religion. Focuses on such cultic and sectarian groups as Christian Science, the American Shakers, the Unification Church, the Hare Krishna movement, and the Black Muslims. Provides the student the opportunity to acquire critical investigative tools with which to analyze different religious expressions.

PHL 1293 Mysticism: East and West

4 QH

Offers an inquiry into mystical experience through a comparative study of the writings of Christian, Buddhist, and Hindu mystics and of secondary interpretive sources. Considers potential oneness of

man and God, the conflict of mystics with traditional forms of religion, and the possibility of a common, cross-cultural basis for mysticism. *Prereq.* PHL 1115 *or permission of instructor.*

PHL 1295 Medicine, Religion, and the Healers' Art 4 QH
Explores aspects of the historical, religious, and cultural context for contemporary alternatives in health care, beginning with an examination of several examples of traditional healing practices and their accompanying religious and philosophical views about human life. Explores this "holistic" tradition in two frames of reference: the ascendancy of scientific rationalism over religion and the takeover, by male-dominated professions, of healing functions that society has traditionally assigned to women (e.g., the rise of obstetrics and the suppression of midwifery). Gives special attention to major women healers of the nineteenth century. Looks at some contemporary efforts at reintegration of scientific and traditional values in the modern health care system. Gives students the opportunity to meet and interact with patients and healers active in the modern holistic health movement.

PHL 1300 Religion in a Social Context 4 QH
Explores the social forms of religion. Describes and critically evaluates the structures and roles of the church, synagogue, and sect. In addition, emphasizes their functions, with reference to general social structure, process, and reform.

PHL 1305 Religion in the Age of Science 4 QH
Examines the problems posed by the interaction between religion and the natural and social sciences. Uses representative selections from Hume, Darwin, Marx, Freud, Erickson, and Troeltsch to interact with selections from Bultmann, Teilhard de Chardin, Niebuhr, Bonhoeffer, and Tillich.

PHL 1310 The Occult as Religion 4 QH
Focuses on the history, aims, and methods of such esoteric or mystic doctrines as astrology, numerology, magic, demonism, and divination and investigates the structural similarities of these religious forms to those of the dominant religious traditions of the world.

PHL 1315 Understanding the Bible 4 QH
Introduces students to the Old and New Testaments, so that they can enter into a dialogue with the Bible, understanding not only what it says, but why it is said that way. Focuses on the Bible's social, political, and cultural backgrounds. (III)

PHL 1320 The Meaning of Death 4 QH
Offers an inquiry into different philosophical and religious perspectives on death and life after death, including an examination of some powerful contemporary accounts of personal confrontation with death, along with investigations into attitudes toward death in other traditions for example, Hinduism and Buddhism. In addition, explores responses to the Holocaust in Europe and theories about life after death (such as those discussed in Raymond Moody's *Life After Life* and Ian Stevenson's *Reincarnation*). (V)

PHL 1325 Philosophy of Death, Grief, and Dying 4 QH
Explores fears about death and dying and the grieving process and examines the processes people sometimes experience while dying. In addition, examines current practices of caring for the dying and of coping with bereavement, questioning whether these practices are healthy, helpful, and/or ethical. Examines other relevant ethical issues, including euthanasia, truth-telling with the dying, suicide, and paternalism. Closes with the question of the meaning of life, given the fact that we must die.

PHL 1335 Moral Philosophy 4 QH
Explores two basic questions: What sorts of things are good and bad? What actions are right and wrong? Covers major classical conceptions of ancient Greece and Rome, their replacement by the Western religious ethic, its modification and rejection in the early modern period, and the emergence of modern versions of traditional conceptions of the good life, with reflections on the nature of ethical inquiry itself as a legitimate study. *Prereq.* 4 QH *philosophy or religion or permission of instructor.*

PHL 1340 Aesthetics 4 QH
Offers a historical approach to aesthetics, the philosophical analysis of concepts and the solution of problems that arise when one contemplates beautiful (or ugly) objects. Also explores standards of value in judging art by asking the following questions: What features make objects beautiful (or ugly)? Are there aesthetic standards? What is the relation of works of art to nature? What is the nature of an aesthetic experience? *Prereq.* 4 QH *philosophy.*

PHL 1345 Philosophy of Religion 4 QH
Asks the basic question "Does God exist?" Examines several major arguments affirming and criticizing the notion of God's existence. Explores a central problem in recent philosophy of religion of whether or not it makes any sense to speak of the truth (or falsity) of religious belief, as well as the implication an answer to that issue has for religious life. *Prereq.* 4 QH *philosophy.*

PHL 1350 Philosophy of Human Nature 4 QH
Offers a philosophical inquiry into the theories of man, man's dimensions, and human nature. Examines the question of the existence of human nature. Pays special attention to contemporary theories of man and self-alienation and their influence in social sciences. Includes selected readings from Descartes, Hobbes, Hegel, Marx, Kierkegaard, Maritain, Freud, Skinner, Fromm, and Frankl.

PHL 1355 Existentialism and Literature 4 QH
Explores existentialist philosophy, which after World Wars I and II inspired the literature of "extreme situations." Examines human extreme experiences in existentialist philosophy and novels. Considers the major themes of loneliness; self-alienation; social pressures; conformity; absurdity; anxiety; social, political, and moral crises; nothingness; and death. Includes readings from the most influential European and American authors.

PHL 1360 Philosophy and Literature**4 QH**

Provides the student the opportunity to learn to recognize, appreciate, and criticize philosophical themes in literature. Includes readings from acknowledged classics by philosophical authors such as Voltaire, Dostoevski, and Sartre; popular contemporary authors such as Vonnegut, Barth, and Pynchon; and readings from more straightforward philosophical sources. Examines the meaning of life, the human condition, depersonalization, alienation, human freedom, questions of value, responsibility, rationality, and personal identity. Explores religious, nihilistic, existential, and other viewpoints.

PHL 1370 The Meaning of Life**4 QH**

Examines selected philosophical problems of human existence in the contemporary world, with major emphasis on the search for identity and self-fulfillment. Discusses selected problems such as freedom, death, sexuality, alienation, becoming a person, and peak experiences. Includes readings from Kierkegaard, Heidegger, Sartre, Camus, Maslow, Allport, Frankl, Rogers, and Rollo May.

PHL 1375 Freud, Skinner, and Their Critics**4 QH**

Examines fundamental themes and concepts of Freud's psychoanalysis and Skinner's psychology from a philosophical perspective and criticisms of them from the point of view of reformed Freudians and existentialists. Includes selections from Freud, Jung, Adler, Karen Horney, Skinner, Koestler, Pearls, Sartre, Merleau-Ponty, and Kovaly. *Prereq.* 4 QH philosophy or permission of instructor.

PHL 1400 Theory of Knowledge**4 QH**

Introduces epistemology, or theory of knowledge, which asks the following questions: What is knowledge? Is knowledge (or even certainty) attainable? What are the limitations of human knowledge? How is knowledge—if we have it—acquired? What roles do reason and experience play in the attempt to attain knowledge? Studies both classical (Rene Descartes and David Hume) and contemporary sources (Bertrand Russell and others). Examines and criticizes various theories of knowledge, such as empiricism, rationalism, and scepticism. Encourages students to form at least tentative opinions on these issues. *Prereq.* 4 QH philosophy or permission of instructor.

PHL 1405 Metaphysics**4 QH**

Considers central problems and theories concerning the nature of reality, with special attention to such areas as the relation between mind and matter, free will and determinism, and criteria of existence. *Prereq.* 8 QH philosophy.

PHL 1410 Philosophy of Science**4 QH**

Focuses on the nature of scientific method, scientific theories, and scientific explanations. Examines the central question of why science is thought to provide the most reliable account of the nature of reality. Considers various theories about the nature and reliability of science. *Prereq.* 4 QH philosophy.

PHL 1415 Advanced Logic**4 QH**

Studies the major results in the meta-theory of first order logic. Examines consistency, completeness, and decidability. Discusses the general notion of an effectively computable process, Church's thesis, and the existence of unsolvable problems. *Prereq.* PHL 1215.

PHL 1430 Philosophy of Psychology**4 QH**

Examines the philosophical and scientific foundations of behavioristic psychology, with emphasis on the acquisition and use of language. Discusses alternative conceptions, for example, Chomsky's and those arising from computer studies. *Prereq.* 4 QH philosophy or 4 QH psychology or permission of instructor.

PHL 1435 Philosophy of Mind**4 QH**

Seeks to show what puzzles and problems result from an honest attempt to answer these questions in a reasonable way: What is the relation between mind and body? Is the mental merely a function of bodily process and behavior, or does it somehow exist "over and above" the material? How are self-knowledge and knowledge of other minds achieved? What is the relation between words and thoughts? Examines classical sources, such as Descartes and Locke, and contemporary sources, such as Wittgenstein and Putnam. Also seeks to arrive at some answers—however tentative or provisional—to these questions. Constantly, challenges the student to think and write well about these difficult subjects. *Prereq.* 4 QH philosophy.

PHL 1440 Philosophy of Language**4 QH**

Examines prospects for a theory of language, its syntax, and its semantics. Examines contrasts between theory of reference and theory of meaning. Asks whether there are universals of language? Analyzes relations between linguistics and psychology. Includes readings from Frege, Quine, Russell, Chomsky, and Fodor. *Prereq.* Permission of instructor.

PHL 1550, PHL 1551, PHL 1552**4 QH each****Honors 1, 2, and 3**

Students interested in taking junior/senior honors courses should confer with the department chair. Arrangements are made between the student and a member of the faculty. Staffing is by arrangement.

PHL 1565 Seminar in Wittgenstein**4 QH**

Ludwig Wittgenstein is one of the most influential, if not the most influential, philosophers of the twentieth century. A mysterious yet charismatic figure, he possessed both analytic genius and the creativity of a visionary. With unparalleled intensity, he addressed himself to philosophical problems. What is the relationship between language and the world? Are there thoughts "too deep" for words? What, if anything, can be said about the mystical, the beautiful, and the religious? What is consciousness and what is its role in action? What are the big, simple, mistaken ideas that cripple the philosophical enterprise? How

should philosophers proceed? What is meaningful? Wittgenstein's thought is so unique that it cannot be said that any other course or courses in philosophy will prepare the student for it. On the other hand, intelligent students with little formal preparation can profit from a study of Wittgenstein, given the proper dedication to truth. *Prereq.* 8 QH philosophy or permission of instructor.

PHL 1700 Introduction to Philosophy (Honors) 4 QH
Honors equivalent of PHL 1100.

PHL 1740 Social and Political Philosophy (Honors) 4 QH
Honors equivalent of PHL 1140.

PHL 1800 Directed Studies 4 QH
Those interested in the directed studies program should meet with the department chair. *Prereq.* By arrangement between student and faculty.

PHL 3265 Issues in Medical Ethics 4 QH
Focuses on issues in medical ethics, especially as they are likely to arise in a clinical setting. Begins

with exploration of the two basic systems of ethical theory and then concentrates on their application in cases exemplifying the issues of euthanasia, paternalism, experimentation, informed consent, quality of life, professional responsibility, right to health care, truth telling, genetic control, abortion, and the allocation of scarce medical resources. *Prereq.* Permission of instructor.

INT 1400 Professional Practices: Individual and Social Dimensions 4 QH

Explores the dimensions and dilemmas of freedom and responsibility confronting professional people practicing within the limits set by socioeconomic conditions, clients, and peers. Examines case histories to illustrate the dilemmas professionals face, the choices that are typically made, and the consequences these have on the freedom of the practitioner and on personal and professional integrity.

Physics

Some courses in the College of Arts and Sciences are duplicated in different departments or colleges or within a department. You may not receive credit for two such courses. If you have a question about whether one course overlaps another, please consult the departments involved and the Office of the Dean before taking the course.

Numbers inside parentheses within course descriptions refer to core curriculum categories listed on page 2.

Courses are listed according to level and degree of specialization. General interest courses have no prerequisites and may be used to satisfy College of Arts and Sciences distribution requirements in science. Introductory physics courses are basic first-year physics lecture courses; the corresponding labs are listed under "Introductory Physics Laboratories." Advanced physics and astronomy courses require one year of introductory physics and may be used to satisfy degree requirements for physics majors.

General Interest Courses

PHY 1101 Physics in Music 4 QH
Discusses the physical principles involved in producing, recording, and reproducing music. Explains the operation of various instruments in terms of the basic properties of resonances and waves; physical and psychological response of the ear; the physical basis of the modern (well-tempered) system of tuning; the operation of microphones, amplifiers, loud speakers, tape recorders, radios, and other devices.

PHY 1111 Introduction to Astronomy I 4 QH
The first of a two-quarter sequence, offers the non-science student an introduction to modern astronomical ideas. Includes such topics as introduction to the cosmos; tools of the astronomer (atoms, the nature of light and radiation, telescopes, space astronomy); the earth in space; our solar system (origin and future of the solar system, the planets and other bodies, the latest from spacecraft flights, the sun as our bridge to the stars); the question of life in the universe. (II)

PHY 1121 Introduction to Science I 4 QH
With PHY 1122, forms a two-quarter sequence for nonscience majors that provides an interdisciplinary

treatment of the basic ideas of the natural sciences. Discusses concepts such as energy, gravity, and the atom, followed by a consideration of the ways in which atoms combine to form the substances that comprise matter. (II)

Introductory Physics Courses

PHY 1191 Physics I 4 QH
Focuses on units and scientific notation, force, Newton's first law, static equilibrium, Newton's second law, momentum, work, kinetic energy, potential energy. *Prereq.* MTH 1191, which may be taken concurrently; BET majors only.

PHY 1192 Physics 2 4 QH
Focuses on power, rotational motion, Pascal's law, hydrostatic pressure, molecular mass, ideal gas law, first and second laws of thermodynamics, simple harmonic motion, wave motion, sound, and light. *Prereq.* PHY 1191; MTH 1192, which may be taken concurrently; BET majors only.

PHY 1193 Physics 3 4 QH
Focuses on electrostatics, circuit elements, direct current circuits, magnetism, electromagnetic induction, electromagnetic waves, atomic and nuclear physics. *Prereq.* PHY 1192; *BET majors only.*

PHY 1201 Physics for the Life Sciences 1 4 QH
Focuses on vector addition of force, principles of statics; Newton's second law, kinetic and potential energy; pressure static properties of fluids, fluid flow. To take the lab for this course, register for PHY 1501 concurrently. (II)

PHY 1202 Physics for the Life Sciences 2 4 QH
Focuses on wave motion, sound, light, optics, static electricity, DC circuits, magnetism. To take the lab for this course, register for PHY 1502 concurrently. (II) *Prereq.* PHY 1201.

PHY 1203 Physics for the Life Sciences 3 4 QH
Focuses on temperature, gas laws, properties of liquids (surface tension and osmotic pressure), properties of solids, thermal physics, Coulomb's law, and atomic and nuclear physics. *Prereq.* PHY 1202.

PHY 1209 Basic Physics 1 4 QH
Focuses on the physical properties of gases and condensed matter, force and pressure, hydrostatics, ideal and real gases, condensation and evaporation, surface tension, osmosis and fluid flow. Includes lab as an integral part of the course. *For respiratory therapy students only.*

PHY 1221 Physics for Engineering Students 1 4 QH
The first quarter of a four quarter sequence intended primarily for engineering students, covers mechanics, kinematics, dynamics, Newton's laws, work, energy, linear momentum, collisions. *Prereq.* MTH 1123 or *equiv.*, which may be taken concurrently.

PHY 1222 Physics for Engineering Students 2 4 QH
Continues PHY 1221. Focuses on rotational dynamics, angular momentum, statics, harmonic motion, wave motion, sound, and optics. *Prereq.* PHY 1221; MTH 1124 or *equiv.*, which may be taken concurrently.

PHY 1223 Physics for Engineering Students 3 4 QH
Continues PHY 1222. Focuses on electricity, electrostatics, Gauss's law, electric fields, potential, capacitance, resistance, current Ohm's law, circuits, the magnetic field. *Prereq.* PHY 1222; MTH 1125 or *equiv.*, which may be taken concurrently.

PHY 1224 Physics for Engineering Students 4 4 QH
Continues PHY 1223. Covers induction, inductance, and energy in the magnetic field; electromagnetic waves; exponential processes; and elementary thermodynamics. *Prereq.* PHY 1223; and MTH 1126 or *equiv.*, which may be taken concurrently.

PHY 1231 Physics for Science Majors 1 4 QH
Focuses on mechanics, kinematics, Newton's laws, circular motion, work energy, and linear momentum. To take the lab for this course, register for PHY 1531 concurrently. (II) *Prereq.* MTH 1143 or *equiv.*, which may be taken concurrently.

PHY 1232 Physics for Science Majors 2 4 QH
Focuses on rotational motion, angular momentum, harmonic motion, wave motion, sound, heat and thermodynamics, kinetic theory. To take the lab for this course, register for PHY 1532 concurrently. (II) *Prereq.* PHY 1231; and MTH 1144 or *equiv.*, which may be taken concurrently.

PHY 1233 Physics for Science Majors 3 4 QH
Focuses on electricity and magnetism; circuits; electromagnetic waves; topics in modern physics. To take the lab for this course, register for PHY 1533 concurrently. *Prereq.* PHY 1231; and MTH 1145 or *equiv.*, which may be taken concurrently.

PHY 1251 Physics Review for Engineering Students 6 QH
Offers an intensive review for students who have had previous college physics courses not equivalent to the engineering sequence of PHY 1221 through PHY 1224. Covers fundamentals of mechanics, electricity, and magnetism, with emphasis on the use of vectors and elementary calculus. Equivalent to PHY 1223 and PHY 1224. *Prereq.* One year of college physics and knowledge of elementary calculus.

Introductory Physics Laboratories

PHY 1194 Physics Laboratory 1 2 QH
Covers experiments from various physics topics covered in PHY 1191 and, concurrently, in PHY 1192. Lab fee. *Prereq.* PHY 1191; PHY 1192 concurrently; *BET majors only.*

PHY 1195 Physics Laboratory 2 2 QH
Covers experiments from various physics topics covered in PHY 1192 and, concurrently, PHY 1193. Lab fee. *Prereq.* PHY 1194, PHY 1192; PHY 1193 concurrently; *BET majors only.*

PHY 1501 Physics Laboratory for the Life Sciences 1 1 QH
Accompanies PHY 1201. *Prereq.* PHY 1201 concurrently.

PHY 1502 Physics Laboratory for the Life Sciences 2 1 QH
Accompanies PHY 1202. *Prereq.* PHY 1501; PHY 1202 or PHY 1203 concurrently.

PHY 1521 Physics Laboratory for Engineering Students 1 1 QH
The first of a two-quarter lab sequence in which the student performs experiments from various fields of physics. *Prereq.* PHY 1223.

PHY 1522 Physics Laboratory for Engineering Students 2 1 QH
Continues PHY 1521. *Prereq.* PHY 1521 and PHY 1224.

PHY 1531 Physics Laboratory for Science Majors 1 1 QH
Focuses on lab experiments related to topics covered in PHY 1231. *Prereq.* PHY 1231 concurrently.

PHY 1532 Physics Laboratory for Science Majors 2 1 QH
Focuses on lab experiments related to topics covered in PHY 1232. *Prereq.* PHY 1531; PHY 1232 concurrently.

PHY 1533 Physics Laboratory for Science Majors 3 1 QH
Focuses on lab experiments related to topics covered in PHY 1233. *Prereq.* PHY 1531; PHY 1233 concurrently.

Advanced Physics and Astronomy Courses

PHY 1301 Intermediate Mechanics 4 QH
Focuses on classical mechanics in two and three dimensions; a review of Newton's laws; special emphasis on conservation theorems for energy, momentum, and angular momentum; harmonic and wave motion. *Prereq.* PHY 1232 and PHY 1233; and MTH 1243 concurrently.

PHY 1302 Electric and Magnetic Fields 4 QH
Focuses on the basic concepts of electric and magnetic fields, including electric and magnetic fields in free space and materials; Maxwell's equations in integral form. *Prereq.* PHY 1301; and MTH 1244 concurrently.

PHY 1303 Modern Physics 4 QH
Reviews experiments demonstrating the atomic nature of matter, the properties of the electron, the nuclear atom, the wave-particle duality, spin, and the properties of elementary particles. Discusses, mostly on a phenomenological level, such subjects as atomic and nuclear structure, properties of the solid state, and elementary particles. *Prereq.* PHY 1233, PHY 1224, or equiv.

PHY 1304 Mathematical Physics 4 QH
Reviews linear algebra and vector calculus, special functions and partial differential equations of physics, potential theory, functions of a complex variable. *Prereq.* MTH 1244 and PHY 1233; and MTH 1246 concurrently.

PHY 1305 Thermodynamics and Kinetic Theory 4 QH
Focuses on first and second laws of thermodynamics, entropy and equilibrium, thermodynamic potentials, elementary kinetic theory, statistical mechanics and the statistical interpretation of entropy. *Prereq.* PHY 1224 or PHY 1233; and MTH 1244.

PHY 1401 Classical Mechanics 4 QH
Covers advanced topics in classical mechanics, including vector kinematics, harmonic oscillator and resonance, generalized coordinates, Lagrange's equations, central forces and the Kepler problem, rigid body motion. *Prereq.* PHY 1301 and MTH 1245.

PHY 1402 Electricity and Magnetism 1 4 QH
Covers Maxwell's equations and their experimental basis, electrostatics and magnetostatics, the electromagnetic field in empty space, electromagnetic waves. *Prereq.* PHY 1302; and PHY 1304 or equiv.

PHY 1403 Electricity and Magnetism 2 4 QH
Continues PHY 1402. Focuses on energy and momentum in the electromagnetic field, electrodynamics, the interaction of matter and the field, radiation. *Prereq.* PHY 1402 or equiv.

PHY 1404 Wave Motion and Optics 4 QH
Focuses on harmonic and coupled oscillators, wave equation; geometrical and physical optics; interference, diffraction, optics of solids, amplification of light; and lasers. *Prereq.* PHY 1302.

PHY 1411 Introduction to Astrophysics and Cosmology 4 QH

Introduces the student to current ideas in astrophysics and cosmology, with emphasis on recent advances in this field. Focuses on tools of the astronomer (gamma-, X-, UV-, optical-, infrared-, radio-telescopes, spectrometers, spacecrafts, and so on); solar system; stellar properties (site luminosity); stellar spectra; Hertzsprung-Russell diagram; stellar energy sources (gravitational, nuclear); evolution of stars (birth, main sequence, red giants, white dwarfs, planetary nebulae, supernovae, neutron stars and pulsars, black holes and gravitational collapse); methods of interstellar and intergalactic distance measurement; our Milky Way galaxy; extragalactic objects (galaxies, clusters of galaxies, radio galaxies, quasars); cosmology (Olber's paradox; recession of galaxies, big bang theory, cosmic background radiation, formation of galaxies, the future of the universe). *Prereq.* Three quarters of elementary physics.

PHY 1413 Introduction to Nuclear Physics 4 QH
Focuses on nuclear structure, nuclear masses, radioactivity, nuclear radiation, interaction of radiation and matter, detectors, fission, nuclear forces, elementary particles. *Prereq.* PHY 1303.

PHY 1414 Introduction to Solid State Physics 4 QH
Offers a semiclassical treatment of the thermal, magnetic, and electrical properties of crystalline solids. Examines X-ray diffraction and the reciprocal lattice, elasticity and lattice vibrations, specific heat, properties of insulators, magnetism in insulators and metals, and introduction to the band theory of metals. *Prereq.* CHM 1383 or PHY 1303; and PHY 1305 or equiv.

PHY 1415 Quantum Mechanics 1 4 QH
Focuses on observation of macroscopic and microscopic bodies, the uncertainty principle, wave-particle duality, probability amplitudes, Schrodinger wave theory, and one-dimensional problems. *Prereq.* CHM 1383 or PHY 1303; and PHY 1304 or equiv.

PHY 1416 Quantum Mechanics 2 4 QH
Continues PHY 1415. Covers discrete and continuous states, Schrodinger equation in three dimensions, angular momentum, general theory of quantum mechanics, applications. *Prereq.* PHY 1415.

PHY 1551 Electronics for Scientists 1 4 QH
With PHY 1552, forms a two-quarter sequence covering electronic techniques for experimental research in many different fields of science. Focuses on principles of semiconductor devices; analog techniques (amplification, feedback, integration); digital techniques (counting, multiplexing, logic); design of electronic subsystems (analog-to-digital converters,

phase-sensitive detectors, data-logging systems); understanding specifications of commercial electronic equipment. In lab examples, makes use of up-to-date integrated and discrete devices such as are currently used in the electronic industry.

PHY 1552 Electronics for Scientists 2 4 QH
Continues PHY 1551. *Prereq.* PHY 1551.

PHY 1555 Wave Laboratory 4 QH
Offers a general treatment of the problems of mechanical and electromagnetic radiation as wave phenomena. Focuses on the differential wave equation and its application to selected topics; interference and diffraction theory from the standpoint of the Huygens-Fresnel and Kirchhoff formulations; selected experiments in acoustics, optics, and micro-waves to illustrate these problems. *Prereq.* PHY 1224 or PHY 1302.

PHY 1557 Advanced Physics Laboratory 4 QH
Presents special projects in modern experimental physics, including electronic instrumentation used in measuring physical quantities and use of microprocessors. *Prereq.* PHY 1551 and PHY 1552.

PHY 1561 Project Laboratory 4 QH
Allows students to select and carry out individual projects involving instrumentation and computation. Involves the development of some aspect of instrumentation and/or computation in an ongoing research project and the preparation of a final report. The student will be supervised by the project leader and the course instructor. (Although the course carries 4 QH credit, it is taken in successive winter and spring quarters.) *Prereq.* Permission of instructor.

PHY 1711 Introduction to Astronomy 1 (Honors) 4 QH
Honors equivalent of PHY 1111.

PHY 1721 Physics 1 (Engineering) 4 QH
Honors equivalent of PHY 1221

PHY 1722 Physics 2 (Engineering) 4 QH
Honors equivalent of PHY 1222

PHY 1723 Physics 3 (Engineering) 4 QH
Honors equivalent of PHY 1223.

PHY 1724 Physics 4 (Engineering) 4 QH
Honors equivalent of PHY 1224.

PHY 1811, PHY 1812, PHY 1813 1 QH each
Independent Study

PHY 1821, PHY 1822, PHY 1823 2 QH each
Independent Study

PHY 1831, PHY 1832, PHY 1833 3 QH each
Independent Study

PHY 1841, PHY 1842, PHY 1843 4 QH each
Independent Study

PHY 1885, PHY 1886, PHY 1887 4 QH each
Junior/Senior Honors Program
For details, contact the Honors Office, 183 Holmes.

INT 1570 On Understanding Science 4 QH
Develops the quantitative and qualitative skills needed to critically read about science in newspapers and magazines. Examines the historical, philosophical, and social nature of science; units and scientific notation; technological developments of the last two hundred years; sources of information; and current scientific developments.

Political Science

Some courses in the College of Arts and Sciences are duplicated in different departments or colleges or within a department. You may not receive credit for two such courses. If you have a question about whether one course overlaps another, please consult the departments involved and the Office of the Dean before taking the course.

The numbers inside parentheses within course descriptions refer to core curriculum categories listed on page 2.

POL 1110 Introduction to Politics 4 QH
Offers a broad-based introduction to contemporary political science. Includes a consideration of basic concepts in political analysis (for example, power, authority, and sovereignty), the role of governmental institutions in the making of public policy, public opinion and processes of political representation, contemporary political ideologies, and the scope and methods of political science. (II)

POL 1111 Introduction to American Government 4 QH
Analyzes the American governmental and political processes by focusing on constitutionalism, liberties, institutions, and political behavior. (II)

POL 1112 Introduction to International Relations 4 QH
Applies basic theories of international relations to examining the foreign policies of the key actors in

the international system. Covers topics of international aid, trade, and monetary affairs; issues relating to the arms race, nuclear proliferation, arms control, and disarmament; international law and organizations, human rights, and the impact of technology on the functioning of the international system. (II)

POL 1113 Introduction to Foreign Governments and Societies 4 QH

Offers a comparative study of parliamentary democracy in Western Europe; Communist totalitarianism in the Soviet Union, China, and Eastern Europe; and variations of these governmental systems in the third world countries of Asia, Africa, and the Middle East. Formerly "Introduction to Comparative Government."

POL 1260 Public Policy Analysis 4 QH

Analyzes and evaluates public policy in the United States. (VI)

POL 1261 Public Administration 4 QH

Focuses on the theory and practice of public administration, emphasizing the generalities of institutions, processes, and behavior of bureaucratic organizations.

POL 1262 Organization Theory 4 QH

Provides a broad overview of organization theories, their history, and development. Gives specific attention to developing a paradigm for public organizations that focuses on the relationships of economic, democratic, bureaucratic, technological, and humanistic imperatives. Requires the student to prepare a research paper and consider the implications of this paradigm for future organizations.

POL 1266 Public Personnel Administration 4 QH

Presents an overall introduction to the field of public personnel administration. Examines selected topics such as recruitment, selection, classification, case development, equal opportunity, public employee unionism, and collective bargaining. *Prereq. POL 1261.*

POL 1267 Public Budgeting 4 QH

Focuses on the function of budgeting in a variety of governmental contexts, specifically, the appropriations process, the budget as a management tool, and the public policy impacts of the budget. Emphasizes budgeting techniques within this context. *Prereq. POL 1261.*

POL 1300 Conceptual Foundations of Contemporary Political Analyses 4 QH

Provides an introduction to the conceptual problems associated with the study of politics, including scientific method and a general overview of various methodological perspectives (for example, systems theory, game theory, and survey analysis) as practiced by contemporary political scientists.

POL 1301 Research Methods I 4 QH

Offers an introduction to the principal quantitative methods used in political analysis, public administration, political behavior, international relations, and policy sciences. Emphasizes basic statistical techniques, survey methods, and SPSS programming.

POL 1302 Research Methods 2 4 QH

Focuses on methods of quantitative analysis. Covers the following primary statistical topics: significance testing, bivariate regression and correlation, and multiple regression and correlation. In addition, teaches elementary computer skills and the use of the programming language Statistical Package for the Social Sciences (SPSS) to calculate advanced statistics. Emphasizes the practical application and understanding of statistical techniques by providing numerous examples in the areas of political behavior, public opinion, and public policy analysis. *Prereq. POL 1301.*

POL 1303 Political Behavior 4 QH

Examines selected topics in contemporary political science from a political behavior perspective. Focuses on political attitude formation and change, ideology, socialization, public opinion and voting behavior, political campaigning, political violence, and empirical democratic theory.

POL 1304 Practical Politics 4 QH

Accentuates and systematically treats some of the problems of organizing for effective citizen action, partisan and nonpartisan, at the grass-roots level. Explores roles in political campaigning.

POL 1306 Politics in Western Europe 4 QH

Offers a comparative analysis of political culture, federal and unitary forms of government, and executive-legislative relations on the national level in England, France, and West Germany. (III)

POL 1307 European Political Parties 4 QH

Focuses on political party organization and voter behavior in England, France, and Germany, with emphasis on party ideologies, strategies, campaigns, and elections, as well as socialization. Examines recruitment and participation of voters in the political process. *Prereq. POL 1113.*

POL 1308 The Politics of Poverty 4 QH

Explores what is referred to as the poverty system: how and why there is poverty, how it affects people's lives, and how it can be eliminated. As a discussion-centered course, relies on simulations, small-group work, and experience-based learning; examines the relations between poverty, racism, and the economic, political, and administrative systems. Evaluates a number of alternatives and provides an opportunity for clarifying individual assumptions and feelings about poverty.

POL 1309 The Politics of Imperialism 4 QH

Focuses on the political dynamics of penetration of foreign economies and foreign politics. Considers such elements as military intervention, foreign aid, and the impact of the multinational corporations.

POL 1310 American Ideology 4 QH

Analyzes the main American ideologies, including liberalism, neoliberalism, conservatism, neoconservatism, and nationalism. Examines the historic roots of each ideology and its impact on American politics. Explores the ongoing interaction of political ideology and the political process in contemporary American society. (V)

POL 1312 Politics and the Mass Media 4 QH

Analyzes several facets of the mass media: the role of newspapers, radio, and television in public opinion formation; their use and effectiveness in political campaigns; their objectivity and/or bias in reporting the news; their impact on political parties and the distribution of power between Congress and the President.

POL 1313 International Organization 4 QH

Focuses on development of international organizations with special emphasis on the United Nations system. (Public Administration elective.)

POL 1314 Interest Groups and Public Policy 4 QH

Surveys the roles of organized interests in American public policymaking. Examines why groups are formed, how they work, why they succeed or fail, and what cumulative impacts groups have on policy. Spans a variety of groups, from traditional economic interests to social movements, public interest organizations, and professional lobbyists.

POL 1315 The Politics of the Criminal Justice System 4 QH

Focuses on the criminal justice system, from arrest by police to appeal to the Supreme Court of the United States. Examines the roles of police, lawyers, judges, prosecutors, juries, and correction officers. *Prereq.* POL 1111 or POL 1377.

POL 1316 Contemporary Revolutionary Politics 4 QH

Examines political development in selected revolutionary societies, including Cuba. (VI)

POL 1317 Law and Society 4 QH

Examines the theory and practice of the American legal process and its impact on values. Analyzes the impact the military-industrial-technological complex has on these values. *Open to upperclass students only.*

POL 1318 State and Local Government 4 QH

Introduces students to the political and administrative context of state and local government and surveys the structure, function, and politics of states and localities within the context of the United States federal system. (Public Administration elective.) *Prereq.* POL 1111.

POL 1320 Political Parties, Pressure Groups, and Elections 4 QH

Analyzes political parties and pressure groups in the American political system, with attention given to policy making, elections, voting behavior, and state and national political trends.

POL 1321 Eurocommunism 4 QH

Examines the domestic and foreign policies of the Spanish, French, and Italian Communist parties, with special attention to their relations with the international communist movement.

POL 1322 World Politics 4 QH

Emphasizes various principles, techniques, and patterns that governments have followed to implement their goals or objectives. Uses a case study approach, with an emphasis on the problems associated with the Middle East analyzed from the United States-Soviet and Arab-Israeli viewpoints.

POL 1324 Urban Politics 4 QH

Analyzes the political, administrative, economic, and social dynamics of urban areas from a historical perspective. (Public Administration elective.)

POL 1325 Human Services Administration 4 QH

Studies the ways in which human services are provided by the political, economic, and bureaucratic

systems to low-income citizens. Helps students develop knowledge of the public policy process, human services organizations and delivery systems, and awareness of their values and potential as human services professionals. A discussion-based course for students interested in human services. (Public Administration elective.)

POL 1327 Sex Roles in American Politics 4 QH

Explores the relation between what is and what ought to be—and why—in the roles of women in American politics. Examines the traditional roles of women in politics, the suffrage movement, the woman as citizen and voter, the role of sex in achieving power and in political efficacy, and the place of women in “new politics.” Also covers political action to promote women’s issues and modern feminism. (VI)

POL 1328 Women in Public Management 4 QH

Examines the challenges and problems commonly experienced by female managers working in complex, public sector organizations. Emphasizes strategies for eliminating such problems. Focuses on career development for women in managerial roles.

POL 1329 American Social Welfare Policy 4 QH

Introduces social welfare policy, with emphasis on programs and services in the contemporary United States. Discusses theoretical frameworks for analyzing social welfare policy; then focuses attention on the substantive areas of welfare, mental health, and social security. Explores various issues and processes related to the design, administration, and implementation of social welfare policy in the context of the American socio-political system. Focuses on social welfare policymaking under the Reagan administration.

POL 1330 Minority Politics 4 QH

Examines the voting behavior of minority populations in the United States and political developments and trends that affects the nation’s minority communities.

POL 1331 Science, Technology, and Public Policy 4 QH

Considers the effects of science and technology on politics and policymaking in America and how politics influences science and technology. Focuses on the differences between scientific and democratic values and definitions of rationality, the nature of public problems, and why some problems are easier to “solve” than others. Particularly looks at such issues as nuclear power, recombinant DNA, abortion, and medical research; addresses the question of who should decide such complex matters. (VI)

POL 1332 Government and Politics of Japan 4 QH

Focuses on the development of Japan’s political system since World War II. Examines Japan’s political institutions and practice of democracy in the context of its political culture; the interrelationship between business and government; Japan’s foreign policy; and business practices and organization. Raises issues concerning Japan’s extraordinary economic success and the limitations of Japan as a model for other countries. (IV) *Not open to freshmen.*

POL 1333 Introduction to Urban and Regional Planning 4 QH

Traces the historical influences on American urban and regional planning and the contemporary institutional, theoretical, and technical issues in planning.

POL 1335 The American Presidency 4 QH

Examines the presidential electoral process and the constitutional and extraconstitutional powers of the American President. Studies presidential leadership styles and analyzes the relationship between the executive branch and Congress, the Court, the bureaucracy, and the media.

POL 1336 American Constitutional Law 4 QH

Employing excerpts of United States Supreme Court decisions and other reading materials, attempts to analyze some of the theoretical, structural, and substantive issues inherent in and relevant to the American constitutional system. *Prereq.* POL 1111 and junior or senior standing.

POL 1337 United States Foreign Policy 4 QH

Examines formulation and conduct of foreign policy and the United States since 1945.

POL 1338 Religion and Politics 4 QH

Explores the role of religion in domestic and international politics. Examines religion as a source of political tension and strife. Draws examples from the United States and the developing world. Covers Islamic fundamentalism in African and the Near East, Orthodox Jewish parties in Israel, Catholic liberation theology in Latin America, and Protestant fundamentalism and the religious right in America.

POL 1339 Current Political Issues 4 QH

Analyzes the constitutional and political background of selected contemporary public issues. Primarily for nonpolitical science majors.

POL 1340 Communism in Eastern Europe 4 QH

Focuses on the Communist governments of Eastern Europe, with emphasis on their growing independence from Soviet Russia. Studies recent political change, economic liberalization, and new orientation in foreign policy.

POL 1342 Crisis and Conflict in Black Africa 4 QH

Using films, maps, news clips, discussions, and readings, explores contemporary politics in African nations south of the Sahara. Studies South Africa, Nigeria, Kenya, and Ethiopia, among others. Examines apartheid, colonialism, Afro-Marxism, chieftancy, development, and Pan-Africanism. (VI)

POL 1343 Politics and Violence in Northern Ireland 4 QH

Analyzes the causes of violence in Northern Ireland. Considers historical, sociological, and economic roots of the conflict, but places major emphasis on politics. Also discusses the international dimension (the roles of southern Ireland, the United States, and so on), paramilitary organizations, legal political parties and groups, and potential solutions. Draws comparative parallels, including possible lessons for the United States.

POL 1345 Government and Politics in the Middle East 4 QH

Approaches the political, economic, military, and ideological factors within the Arab states and Israel, inter-Arab politics, the Arab-Israeli conflict, and the great power rivalry in the region. (VI)

POL 1347 Soviet Government 4 QH

Focuses on Soviet political origins and behavior, with emphasis on recent changes in the party and state apparatus, the economy, and the administration of justice.

POL 1348 Soviet Foreign Policy 4 QH

Focuses on the evolution of Soviet foreign policy since 1917, with emphasis on the development of the international communist movement and the onset of the East-West ideological conflict.

POL 1350 American Legislative Process 4 QH

Explores the structures, dynamics, and styles inherent in public policymaking within the U.S. Congress. Focuses on elections; representation of constituents' interests; the roles played by members, the president, interest groups, and other actors; and how all of this is affected by the structure of Congress and the processes embedded in the legislative body.

POL 1351 Techniques and Practices of Public Management 4 QH

Focuses on practical skills and techniques of public management. Employs the case method in examining typical management problems at different levels of government. Also covers time and resource management for public sector managerial personnel.

POL 1353 Law and Personal Morality 4 QH

Examines the use of political power to enforce standards of personal morality and behavior in contemporary American society. Considers such subjects as pornography, sexual privacy and expression, Sunday closing laws, abortion, and prostitution.

POL 1354 The Politics and Policies of Developing Nations 4 QH

Surveys recent political and related change among third world countries of Africa, Latin America, and Asia. Includes such topics as the heritage of colonialism and achievement of independence, the realities of cultural pluralism, revolution and political violence, institution building, political leadership and role of ideology, political parties, the military in politics, and the international aspects of political modernization. (VI)

POL 1355 Ethnic Conflict in International Perspective 4 QH

Offers a comparative study of ethnic conflict, with its religious, linguistic, racial, and economic roots, in such places as Nigeria, Cyprus, Canada, Northern Ireland, Belgium, and the United States. Also examines world-order implications and Great Power consequences of such confrontations.

POL 1357 Totalitarianism and Dictatorship 4 QH

Analyzes totalitarianism, dictatorship, and autocracy, including study of historical background, characteristics, theories of origin, nature, and

significance. Evaluates techniques, ideologies (for example, Marxism-Leninism), policies, and institutions. Gives particular attention to Soviet and German experiences.

POL 1359 Comparative Public Administration 4 QH
Provides a comparative study of the approaches to public administration in selected democratic governments in the United States and Europe.

POL 1360 The Politics of Revolution and Change 4 QH
Analyzes revolution and change, contemporary and historical, with attention to both theory and practice. Discusses major trends in contemporary politics and society and the relationship between political change and technological, scientific, or social change.

POL 1362 Civil Liberties 4 QH
Employing United States Supreme Court decisions and other reading material, examines the substantive and procedural guarantees of the Bill of Rights and the Fourteenth Amendment and their relation to a liberal democratic society.

POL 1363 Public Management 4 QH
What problems are entailed in the management of public agencies? How do public managers seek to solve these problems? Explores these questions through the use of descriptive, analytical, and case materials. (Public Administration elective.) *Prereq.* POL 1261.

POL 1364 Business and Government Relations 4 QH
Surveys the relation between economic developments and political processes in the United States. Considers government planning of the economy, monopoly and government regulation, government programs to promote social welfare, and the impact of Federalism on the political-economic system, among other topics.

POL 1365 British Politics and Government 1 4 QH
Studies British political culture, particularly traditional political values, attitudes, and expectations; the historical, economic, societal, and cultural determinants of them; and their impact on the working of the British political system today. Gives special attention to recent changes in British thought and society, that is, in the period from World War II to the present, and how they have affected contemporary British political behavior.

POL 1366 British Politics and Government 2 4 QH
Studies British political participation, including voting, interest groups, and political parties; and governmental institutions such as the monarchy, the Cabinet, Parliament, and the civil service. Gives special attention to leadership decision making, in particular ministerial accountability, and to current public policy in the areas of the economy, social security and welfare, and Ireland.

POL 1368 Government and Politics of Latin America 4 QH
Examines the governmental systems, political parties, socioeconomic problems, and foreign policies of Latin American states. Focuses on political change. (IV)

POL 1369 Political Violence 4 QH
Analyzes political violence in its various contemporary forms (for example, revolution, genocide, political terrorism, military overthrows). Assesses the causes and consequences of political violence (from both practical and moral points of view) and considers strategies for preventing and resolving political violence.

POL 1370 Political Theory 4 QH
Presents an analytic approach to the study of key political concepts: power, equality, freedom, authority, obligation, ethics, law, rights, punishment, state, sovereignty. *Prereq.* Junior or senior standing or permission of instructor.

POL 1371 Government and Politics of China 4 QH
Focuses on China's political system during Communist party rule. Addresses fundamental issues that the government has been unable to resolve successfully including leadership recruitment and succession; economic growth; class and class struggle; political culture and the educational system; the nature of socialist democracy and socialist legality; and the appropriate form of socialism for a country wishing to modernize rapidly. Examines the interaction among ideology, development, and culture on these issues. (IV) *Not open to freshmen.*

POL 1372 China's Foreign Relations 4 QH
Examines China's traditional view of international relations and its modification first by contact with the West and later by Marxism-Leninism. Investigates China's role in changing the international system to accord more with its perspectives on sovereignty, equality, and the principles of socialist internationalism.

POL 1373 Pre-Modern Political Thought 4 QH
Presents an analytical and historical examination of the great political thinkers and the main trends of political thought from the Grecian age to the Renaissance. (V) *Prereq.* Junior standing or permission of instructor.

POL 1374 Modern Political Thought 4 QH
Presents an analytical and historical examination of the great political thinkers and the main trends in political thought from the Renaissance to the twentieth century. (V)

POL 1376 American Political Thought 4 QH
Traces the contributions to political theory of the main social, economic, political, intellectual, and philosophic movements in America from the colonial period to the present.

POL 1377 American Political Process 4 QH
Analyzes the American political system, with emphasis on civil liberties. Not open to political science majors or anyone who has taken POL 1111.

POL 1378 Contemporary Political Thought 4 QH
Analyzes current ideals, ideologies, and political movements, including existentialism, neo-Marxism, black power, women's liberation. Examines the decline of ideology and behavioralism.

POL 1379 Marx and Marxism 4 QH
Studies the social and political thought of Karl Marx. Examines the development of Marxian theory after Marx's death. Discusses class struggle, social revolution, and communism. (V)

POL 1380 Governmental Accounting 4 QH
Focuses on basic accounting principles and methods used by government agencies, including the utilization and interpretation of financial statements, auditing, and the application of electronic data processing in government record keeping. (Public Administration elective.) *Prereq.* POL 1261.

POL 1382 Intergovernmental Relations 4 QH
Analyzes the relationships among national, state, and local levels of government in the United States and the changing patterns of those relationships.

POL 1384 Arab-Israeli Conflict 4 QH
The Arab-Israeli confrontation has its own dynamics, and its nature has changed through the decades. This course analyzes its effects on the internal politics of the Arab states and Israel, Pan-Arab politics, and the role of the great powers in the region. (VI)

POL 1385 Housing and Community Development 4 QH
Traces historical metropolitan growth patterns and the influence of public policy on the development of American cities. Discusses topics such as urban renewal, suburbanization of low- and moderate-income housing, and new communities. (Public Administration elective.)

POL 1386 International Law 4 QH
Focuses on territory and jurisdiction of states, treaties, recognition, peaceful settlement of disputes, resort to force. *Prereq.* POL 1112.

POL 1388 Political Polling and Survey Research 4 QH
Examines the entire survey research process, which is the most common approach to program evaluation survey design, sampling, questionnaire design, survey administration, data processing, and data analysis. Also involves some statistical analysis. *Prereq.* POL 1301.

POL 1389 American National Security Policy 4 QH
Traces the evolution of American national security policy in the post-World War II period. Considers American nuclear military policy and conventional non-nuclear military policy. Explores arms control policy.

POL 1410 Seminar in American Government 4 QH
Offers an in-depth study of selected topics in American government. *Prereq.* Senior political science major and permission of instructor.

POL 1411 Seminar in International Relations 4 QH
Offers an in-depth study of selected topics in international relations. *Prereq.* Senior political science major and permission of instructor.

POL 1412 Seminar in Comparative Politics 4 QH
Offers an in-depth study of selected topics in comparative politics. *Prereq.* Senior political science major and permission of instructor.

POL 1413 Senior Seminar in Political Science 4 QH
Offers an in-depth study of selected topics in political science. *Prereq.* Senior political science major.

POL 1415 Seminar in Public Law and Social Issues 4 QH
Uses legal writings and recent court cases to examine some of the continuing and perplexing social problems. Discusses issues such as abortion, euthanasia, family planning, criticism of public officials, political activism, the right of privacy, obscenity, racial and economic discrimination. *Prereq.* Junior or senior standing and permission of instructor.

POL 1710 Introduction to Politics (Honors) 4 QH
Honors equivalent of POL 1110.

POL 1711 Introduction to American Government (Honors) 4 QH
Honors equivalent of POL 1111.

POL 1712 Introduction to International Relations (Honors) 4 QH
Honors equivalent of POL 1112.

POL 1800, POL 1801, POL 1802 4 QH each
Directed Study
Offers independent work on chosen topics under the direction of members of the department. *Prereq.* Junior or senior standing and permission of instructor.

POL 1803 Internship in Politics 4 QH
With department approval, students engage in a political or governmental internship under the supervision of a faculty member. Junior or senior status normally required.

POL 1804 Practicum In Lobbying 4 QH
Offers fieldwork opportunity for students to become involved in supervised lobbying activity on the national or state levels of politics. (May be taken only once for academic credit.) *Prereq.* Middler, junior, or senior standing.

POL 1806 Political Science Honors 1 QH
Program Minicourse
Deals with specialized topics in political theory.

POL 1807, POL 1808, POL 1809, PL 1810 4 QH each
Junior/Senior Honors Program
For details contact the Honors Office, 183 Holmes.

Psychology

Some courses in the College of Arts and Sciences are duplicated in different departments or colleges or within a department. You may not receive credit for two such courses. If you have a question about whether one course overlaps another, please consult the departments involved and the Office of the Dean before taking the course.

Numbers inside parentheses within course descriptions refer to core curriculum categories listed on page 2.

For additional information concerning psychology department programs and course scheduling, inquire at the main office of the Department of Psychology, 125 Nightingale Hall, 617-437-3076.

PSY 1110 Perspectives in Psychology 1

4 QH

Surveys the fundamental principles and issues of the major areas of contemporary scientific psychology. Approaches the study of psychology as a method of inquiry as well as a body of knowledge. Emphasizes biological bases of behavior, principles of learning and motivation, psychological testing, personality dynamics, psychopathology, and therapeutic approaches. (Overlaps PSY 1111.) (II)

PSY 1111 Foundations of Psychology 1

4 QH

Surveys the fundamental principles and issues of the major areas of contemporary scientific psychology. Approaches the study of psychology as a method of inquiry as well as a body of knowledge. Emphasizes biological bases of behavior, principles of learning and motivation, psychological testing, personality dynamics, psychopathology, and therapeutic approaches. (Overlaps PSY 1110.)

PSY 1112 Foundations of Psychology 2

4 QH

Continues PSY 1111, emphasizing the areas of lifespan development, sensory and perceptual processes, states of consciousness, cognition, language, memory, emotion, and social influences on behavior. (Overlaps PSY 1113.) *Prereq.* PSY 1110 or PSY 1111.

PSY 1113 Perspectives in Psychology 2

4 QH

Continues PSY 1110, emphasizing the areas of lifespan development, sensory and perceptual processes, states of consciousness, cognition, language, memory, emotion, and social influences on behavior. (Overlaps PSY 1112.) (II) *Prereq.* PSY 1110 or PSY 1111.

PSY 1211 Statistics in Behavioral Science 1

4 QH

Introduces descriptive statistics (scales of measurement, frequency distribution and graphs, measures of central tendency, dispersion and correlation, standard scores, and the unit normal curve) and probability theory (permutations, combinations, and the binomial theorem). *Prereq.* MTH 1101 or MTH 1107.

PSY 1212 Statistics in Behavioral Science 2

4 QH

Offers a general presentation of hypothesis testing, including parametric and nonparametric tests, with emphasis on formulating hypotheses and choosing appropriate scales of measurement, tests, and confidence levels. *Prereq.* PSY 1211.

PSY 1214 Psychological Testing: Science and Politics

4 QH

Focuses on the origins of the intelligence testing movement and its relation to eugenics and to behavior

genetics. Covers history, methods, substantive findings, and social implications of psychological measurement and testing. Beginning with the extensive research literature on IQ testing, examines the "nature/nurture" problem in such areas as psychopathology, criminality, and alcoholism. *Prereq.* *Permission of instructor.*

PSY 1215 Sexual Behavior

4 QH

Focuses on the sexual activities of the human male and female from infancy to adulthood. Considers the importance of sexual factors in the life history of the individual, statistical surveys of sexual behavior, and direct observational measures of sexual responding. Explores the nature of love, responses to pornography, prostitution, bisexuality, male and female homosexuality, rape, child abuse, and sexual therapy.

PSY 1218 Psychology of Women

4 QH

Introduces the student with little or no background in psychology to the current theories and research on the psychology of women. Critically examines psychological, biological, and social influences on gender differences, gender roles, and gender stereotypes in the light of scientific evidence and individual experience. Assesses their consequences for society. Uses the unique perspective generated in the field of the psychology of women to evaluate traditional research methods in psychology as well as the major psychological theories formulated to explain women and the differences between women and men. Emphasizes critical-thinking skills.

PSY 1231 Learning and Motivation 1

4 QH

Offers an introduction to the basic learning and motivational principles that permit humans and animals to adapt effectively to a changing environment. Emphasizes research and theories of operant and Pavlovian conditioning, with discussions of discriminations and generalization, avoidance and punishment, acquired motivational states (for example, addiction), concept formation, biological constraints on learning and behavior, animal cognition, and other related topics. Relates learning and motivational principles to the understanding and treatment of behavioral, affective, cognitive, and motivational disorders. *Prereq.* PSY 1112 or PSY 1113.

PSY 1241 Human Behavioral Development 1

4 QH

Examines the change in behavioral processes from conception up to, but not including, adolescence. Studies biological bases of behavioral development

and the development of motor control, sensation, perception, cognition, language, emotion, personality, and socialization. Examines major theories of development and child-rearing practices. *Prereq.* PSY 1112 or PSY 1113.

PSY 1242 Human Behavioral Development 2 4 QH

Continues the examination of behavioral change from adolescence to death. Examines biological, cognitive, moral, personality, and social processes. Assesses different methods of study and theories of adult development. *Prereq.* PSY 1241.

PSY 1243 Infant Development 4 QH

Focuses on the fact that during the first two years of life, the basic physical perceptual, cognitive and emotional capacities emerge and interact in the development of such complex behaviors as visually guided movement, the formation of social attachments, and the emergence of language. Provides an introduction to this critical period of human development; emphasizes how the infant's biological inheritance interacts with the physical and social environment in the generation of these important abilities and behaviors. *Prereq.* PSY 1241 or ED 1102.

PSY 1251 Food, Behavior, and Eating Disorders 4 QH

Investigates what starts and stops eating behavior. Examines taste, nutrition, metabolism, the brain, food experiences, and societal factors that control feeding behavior. Emphasizes the biological/psychological interaction in normal eating and in pathological eating, such as anorexia, bulimia, and extreme obesity.

PSY 1261 Bilingualism 4 QH

Focuses on the fact that half of the world's population is bilingual, that is, uses two or more languages on a regular basis. Also explores the fact that bilingualism remains a poorly understood phenomenon surrounded by a number of myths, those that hold that bilinguals are found in bilingual countries and are equally fluent in their languages, that bilingual children suffer from cognitive impoverishment; bilingual education hinders the assimilation of minority groups. Reviews all aspects of bilingualism (in the world, in society, in the child and the adult); discusses topics such as biculturalism and language change.

PSY 1262 Language and Cognition 4 QH

Provides a basic introduction to human cognition (cognitive psychology) and the psychology of language (psycholinguistics). On the subject of cognition, emphasizes the mental processes involved in the acquisition, organization, and use of knowledge, including pattern recognition and memory. On the subject of psycholinguistics, focuses on the nature and structure of language, various theories of human production and perception of language, and related experimental findings. *Prereq.* PSY 1112 or PSY 1113.

PSY 1263 Nonverbal Communication 4 QH

Examines the messages we send by posture, facial expression, gesture, gait, and interpersonal distance. Also explores how power, status, and gender affect

nonverbal communication. *Prereq.* PSY 1112 or PSY 1113.

PSY 1264 Animal Communication 4 QH

Examines and compares the communication systems used by animals such as birds, bees, whales, dolphins, and the primates, including chimps and humans. From the four perspectives of biology, linguistics, psychology, and sociology, studies recent attempts to teach other primates some of our languages (sign language, speech, manipulation of tokens or computers); discusses what it means to be a human in the animal kingdom.

PSY 1271 Social Psychology 4 QH

Provides an introductory survey of social psychology. Focuses on aggression, attribution, attitude formation, change, measurement, conformity, impression formation, group processes (social facilitation, deindividuation, for example). *Prereq.* PSY 1112, PSY 1113, or permission of instructor.

PSY 1272 Personality 1 4 QH

Offers a systematic study of the normal personality and its development. Focuses on behavioral, dynamic, and constitutional determinants, assessment of personality, research; surveys the major theories of personality. *Prereq.* PSY 1112 or PSY 1113.

PSY 1273 Personality 2 4 QH

Continues PSY 1272. *Prereq.* PSY 1272.

PSY 1274 Psychology and the Law 4 QH

Traces the effects of psychological factors through the course of a trial, including such issues as accuracy of eyewitness identification, plea bargaining, jury selection, persuasion tactics in the courtroom, presumption of innocence, jury size, jury decision rules, and sentencing and punishment.

PSY 1351 Neuropsychology 1 4 QH

Focuses on the relation between brain function and human behavior. Examines how nerve cells function individually and work together both in small networks and in the nervous system; the structure of the nervous system; how our sense organs provide the nervous system with information about the outside world; how the brain controls movement; and how psychological concepts from motivation to language and memory are represented in the brain. *Prereq.* PSY 1112, PSY 1113, or permission of instructor.

PSY 1352 Neuropsychology 2 4 QH

Continues PSY 1351. Focuses on the relation between brain function and more complex behavior. Examines the multiple kinds of sensory information and the neuronal and hormonal control systems involved in eating, drinking, and sexual and reproductive behavior; how brain activity is related to emotion, sleep, wakefulness, and memory; disorders of behavior and of the brain. *Prereq.* PSY 1351.

PSY 1353 Comparative Psychology and Ethology 4 QH

Surveys animal behavior in a wide range of species (reptiles, birds, fish, and mammals, including humans) to find similarities and differences in the behavioral processes and physiological mechanisms by which individual organisms and species adapt to

their environments. In the first section, focuses on adaptive specializations exhibited by animals in learning about their environments during early development and as adults. In the second section, examines problems of social organizations at the individual level: how animals communicate with each other and transmit "cultural" skills; mechanisms underlying cohesion and dispersal (for example, reproduction and aggression); and the adaptive advantages of being social or asocial. In the final section, provides students with an unusual opportunity to apply concepts and experimental methods they have learned by actually doing a short field study of animal behavior at the Boston Zoological Park. *Prereq.* PSY 1112, PSY 1113, or permission of instructor.

PSY 1361 Introduction to Phonetics 4 QH

Offers an introduction to the nature of the speech signal from articulatory, perceptual, and acoustic points of view. Focuses on sound measurement, sound classes, and a survey and comparison of speech sounds used in languages in the world. Studies stress, tone, and intonation. Examines phonetic classification and transcription of speech as practical tools for students of languages, linguistics, and speech and hearing science. *Prereq.* PSY 1262 or permission of instructor.

PSY 1362 Child Language 4 QH

Examines how language develops in children. *Prereq.* PSY 1262, linguistics, or permission of instructor.

PSY 1363 Linguistics of American Sign Language 4 QH

Offers students an introduction to basic issues in linguistics through examination of the structural properties of American Sign Language and its comparison with other languages having similar properties. Covers phonology (formational properties of signs), morphology (word formation rules, derivation, and inflection; complex verbs, classifiers, verb modulations), semantics (the meaning structure of signs), syntax (the structure of the ASL sentence), and discourse and narrative structure (the structure of ASL utterances in terms of old versus new information and the structure of ASL narratives). *Prereq.* ASL 1101 or permission of instructor.

PSY 1364 Cognition 4 QH

Continues PSY 1262. Focuses on cognition and emphasizes the analysis of perception, memory, and learning within an information-processing framework. Also considers selected topics in cognitive development. *Prereq.* PSY 1262.

PSY 1365 Language and the Brain 4 QH

Focuses on linguistic behavior from a neuropsychological viewpoint. Examines models of how the nervous system, and the brain in particular, controls the production, perception, and internal manipulation of language. Considers localization of cerebral functions and hemispheric lateralization; experimental and clinical evidence for functional models; aphasia and other language pathologies; schizophrenic language; evidence from "slips of the tongue"; and the

bilingual brain. Compares speech, sign language, and writing systems. Also discusses interpretation and translation. *Prereq.* PSY 1262 or permission of instructor.

PSY 1373 Abnormal Psychology I 4 QH

Focuses on the abnormal personality, including a historical survey and a discussion of such issues as anxiety, defense mechanisms, and the criteria of psychopathology. Also examines the symptomatology, etiology, and dynamics of neuroses (hysteria, phobia, obsession, and compulsion) and of psychosomatic disorders. Discusses case histories. *Prereq.* PSY 1112 or PSY 1113.

PSY 1374 Abnormal Psychology 2 4 QH

Offers a survey of psychological and somatic therapies. Examines symptomatology, etiology, dynamics, and therapy of psychoses (schizophrenia, paranoia, mania, depression). Also discusses sociopathic and organic disorders. *Prereq.* PSY 1373.

PSY 1381 Sensation 4 QH

Provides an introduction to the study of our senses, with emphasis on hearing, touch, taste, and smell. Focuses on how we measure our sensory abilities and relates findings to the functioning of sensory organs — ears, skin, mouth, and nose — and of the sensory nervous system. *Prereq.* PSY 1112 or PSY 1113; PSY 1351 is highly recommended.

PSY 1382 Perception 4 QH

Offers a study of our awareness of the world around us, exemplified primarily by visual perception. Covers light, visual sensory mechanisms, color vision, illusions, consciousness, and dreams. *Prereq.* PSY 1112 or PSY 1113; PSY 1351 is highly recommended.

PSY 1431 Behavior Therapies 4 QH

Offers a study of successful projects that have provided effective remediation and rehabilitation in institutions for the mentally ill, the mentally retarded, and the developing human (schools). *Prereq.* PSY 1112 or PSY 1113.

Directed Studies—Honors Courses

PSY 1710 Perspectives in Psychology 1 (Honors) 4 QH
Honors equivalent of PSY 1110.

PSY 1713 Perspectives in Psychology 2 (Honors) 4 QH
Honors equivalent of PSY 1113.

PSY 1770 Honors Directed Study 4 QH
For details contact the undergraduate coordinator in the psychology department, 125 Nightingale Hall.

PSY 1890, PSY 1891, PSY 1892, PSY 1893, QH each
PSY 1894 Directed Study

This course offers independent work under the direction of the psychology department, usually in a research project in one of the department labs. Faculty members normally require completion of advanced lab courses in the area of research interest, but this is a matter of individual discussion. Students interested in directed study should consult a departmental adviser. *Prereq.* Permission of instructor.

PSY 1895, PSY 1896, PSY 1897, PSY 1898, PSY 1899 Junior/Senior Honors Program**4 QH each**

For details contact the Honors Office, 183 Holmes.

Laboratories**PSY 1511 Experimental Design in Psychology** **4 QH**

Focuses on the experimental method in the design, execution, analysis, and reporting of psychological investigations of humans and animals. Lab fee. *Prereq.* PSY 1112 or PSY 1113 and PSY 1212.

PSY 1530 Experiments in Learning and Motivation **4 QH**

Gives students the opportunity to assess the generality, specificity, and robustness of learning and motivational principles through human laboratory studies and field experiments with free-ranging feral animals. Involves designing and conducting experiments and writing reports on operant and Pavlovian conditioning, adjunctive behavior, biofeedback, concept formation, and related topics. Focuses on the theoretical and clinical implications of experimental findings. This course does not use laboratory animals. *Prereq.* PSY 1231 and PSY 1211.

PSY 1531 Learning and Motivation Laboratory **4 QH**

Gives students the opportunity to gain proficiency, through direct experience, in lab analysis of behavior and in evaluating common generalizations about human behavior. Expects students to design and perform experiments in animal and human learning, memory, decision processes, concept formation, and other topics of individual interest. Lab fee. *Prereq.* PSY 1212 and PSY 1231.

PSY 1532 Behavior Modification Laboratory **4 QH**

Gives students the opportunity to participate in education and training of severely and profoundly retarded residents at the Walter E. Fernald State School and to apply learning theory principles to teaching new skills and to treating inappropriate behavior. Also provides students the opportunity to write individual and group training programs, implement them in a classroom setting, and learn methods for evaluating program success. *Prereq.* PSY 1531 or PSY 1351, and permission of instructor.

PSY 1551 Laboratory in Neuropsychology **4 QH**

Students conduct three separate research projects, of which the first two will use rats and the third will use humans as subjects. The three projects investigate the effects of intracranial electrical stimulation of reward systems in the rat brain; electroencephalogram (EEG) records of different phases of sleep and lateralization of function between the left and right cerebral hemispheres. Students carry out all the phases of experimentation, including surgery, behavioral tests, frozen sections and staining of brain tissue in preparation for histological examination of electrode placements, and data analyses. This course ends with oral presentations by students of their research findings. Lab fee. *Prereq.* PSY 1651, PSY 1351, or permission of instructor.

PSY 1562 Laboratory in Psycholinguistics **4 QH**

Provides students the opportunity to acquire first-hand experience in conducting research on problems in the psychology of language. Involves students in all aspects of each experiment, including collecting and analyzing data and preparing reports. Focuses on the particular experiments conducted and the implications of the experimental findings for broader issues in the psychology of language. Lab fee. *Prereq.* PSY 1211 and PSY 1262.

PSY 1564 Cognition Laboratory **4 QH**

Focuses on experiments related to topics in PSY 1262 and PSY 1364. Lab fee. *Prereq.* PSY 1212 and PSY 1262.

PSY 1571 Laboratory in Social Psychology **4 QH**

Provides an introduction to the methods of social-psychological research. Assists students in developing the ability to read published social research with a critical eye, to pose questions in a testable manner, to apply experimental methods to social research, and to express themselves in APA-journal style. Lab fee. *Prereq.* PSY 1212 and PSY 1271.

PSY 1572 Personality Laboratory **4 QH**

Provides an introduction to the methods and areas of personality research. Discusses problems of measurement, control, and interpretation. Critically examines representative published experiments. Expects students to design, collect data for, assess, and write up several experiments, including one original research project. Lab fee. *Prereq.* PSY 1212 and PSY 1272.

PSY 1581 Sensation and Perception Laboratory **4 QH**

Focuses on experiments involving precise measurements of both physical and psychophysical phenomena, including auditory function, color vision and after-effects, muscular sensation, tactile sensitivity, and adaptation to perceptual distortions. Lab fee. *Prereq.* PSY 1212 and PSY 1381 or PSY 1382.

Seminars**PSY 1632 Seminar in Behavior Modification** **4 QH**

Discusses topics in behavior modification in a seminar format. *Prereq.* PSY 1231, PSY 1531, or permission of instructor.

PSY 1651 Seminar in Neuropsychology **4 QH**

Offers intensive study, discussion, and practice in lab studies of physiological variables. Covers evolution of the nervous system, sensory and motor mechanisms, motivation and emotion, sleep, attention and perception, learning, and memory. *Prereq.* PSY 1351 or permission of instructor.

PSY 1652 Sensory Physiology Seminar **4 QH**

Concentrates on the psychophysiology of various sensory systems, vision and hearing in particular. Discusses the problem of accounting for sensory phenomena in terms of physiological concepts. *Prereq.* PSY 1351.

PSY 1661 Seminar in Psycholinguistics 4 QH

Focuses on the on-line processing of language. Discusses recent research in light of such questions as, While listening to someone speak, how does the listener process the information carried by the acoustic signal? What is the role of linguistic rules, prediction strategies, and contextual information? And when speaking, what processing stages are involved from the moment the speaker decides to speak to the moment the articulators start functioning? Examines these and other questions, as well as experimental techniques and current trends in psycholinguistics. *Prereq.* PSY 1262 or permission of instructor.

PSY 1662 Seminar in Cognition 4 QH

Varies in subject matter by term. *Prereq.* PSY 1262.

PSY 1671 Seminar in Social Psychology 4 QH

Expects students to examine and present in class their findings on a particular topic in social psychol-

ogy, for example, attribution, aggression, conformity, attitude-behavior relationship. *Prereq.* PSY 1271 or permission of instructor.

PSY 1672 Seminar in Clinical Psychology and Personality 4 QH

Offers seminar presentations of topics relevant to understanding the normal and disturbed personality. Covers topics such as specialized assessment procedures, cognitive styles in personality, temperament, hypnosis, anxiety, aggression, specialized clinical syndromes, and the development of conscience. *Prereq.* PSY 1373 or permission of instructor.

PSY 1681 Seminar in Sensation and Perception 4 QH

Prereq. PSY 1381, PSY 1382, or permission of instructor.

Anthropology

Some courses in the College of Arts and Sciences are duplicated in different departments or colleges or within a department. You may not receive credit for two such courses. If you have a question about whether one course overlaps another, please consult the departments involved and the Office of the Dean before taking the course.

Numbers inside parentheses within course descriptions refer to core curriculum categories listed on page 2.

SOA 1100 Peoples and Cultures 4 QH

Surveys concepts in anthropology (the study of culture). Analyzes a range of societies in terms of such sociocultural institutions as kinship, gender relations, economics, politics, and religion. Examines important political and economic processes, such as colonialism and development, affecting cultures around the world.

SOA 1101 Cultural Meaning and Everyday Life 4 QH

Using anthropological ideas, studies the underlying patterns of meaning that are below the surface of everyday thought and behavior. Examines daily routines, leisure activities, joking and humor, speech patterns, popular culture, current folklore and mythology, nonmonetary economic transactions, kinship and friendship, and religion and ritual.

SOA 1104 Cultures of the World 4 QH

Introduces the student to societies around the globe. Intensively examines a number of societies analyzes the factors enabling cultures to develop their unique patterns. Emphasizes developing the ability to compare and contrast societies in a controlled and valid way, as well as looking at societies in a constant attempt to adapt to changing environments. (II)

SOA 1120 Camera on Culture: Visual Anthropology 4 QH

Explores how cultures are portrayed on film. Examines anthropologists' use of film to gather information and represent other peoples. Also examines how filmmakers from postcolonial societies have addressed the respective cultures, the experience of colonialism, and the nature of filmmaking and

film/video consumption in the third world. When possible, offers a production experience is included. (IV)

SOA 1125 Introduction to Archaeology 4 QH

Traces the history of archaeology, focusing intensively on key sites in the new and old worlds. Uses film and slides of sites and artifacts extensively.

SOA 1146 Peasants: Community, Culture and Rebellion 4 QH

Provides students with an understanding of peasant societies in the third world today. Outlines classic peasant studies, but focuses on the relationship between peasant communities and class formation, and peasant organizing efforts on issues such as land reform. Examines the gender division of labor, peasant households, peasant ceremonial life. Uses case studies on Latin America, but also includes examples from other areas. (IV)

SOA 1155 Individual and Culture 4 QH

Explores the ways in which individuals are shaped by society and the ways in which they can effect change.

SOA 1160 Sex, Sex Roles, and Family 4 QH

Examines popular and scientific notions about sex, gender relations, family, and kinship. Examines why our images of family, masculinity, and femininity are not universal by analyzing the patterns of sex roles, sexual practices, and kinship in other cultures. Discusses how and why relations between men and women change during times of socioeconomic and political change.

SOA 1185 War and Aggression**4 QH**

Using anthropological investigations, critically evaluates the assumption that aggression is part of human nature and linked to sex differences. Discusses cross-cultural variation in violent behavior and warfare in the context of wider political and economic processes. Analyzes the widespread belief in innate masculine aggression as it relates to contemporary societal violence and militarism.

SOA 1255 Culture and Mental Illness**4 QH**

Discusses and analyzes the nature and meaning of culture, the role of culture in personality formation, culture and anxiety, anthropological approaches to the "normal" and the "abnormal," and the question "Is mental illness psychological fact or cultural fiction?"

SOA 1255 Sport in Society**4 QH**

For course description, see SOC 1255.

SOA 1267 The Anthropological Study of Myth**4 QH**

Focuses on theories concerning the nature and meaning of myth. Explores the function of myth in social and cultural change. Covers the structural analysis of myth.

SOA 1275 Musical Culture: Notes in the Modern World**4 QH**

The ongoing social, political, and cultural dialogues reflect the people who compose, play, and listen to music. This course explores issues of class, ethnicity, gender, sexuality, and age in the cross-cultural context of music as expressed in performances, recordings, videos, literary, and ethnographic materials. The course will also examine the social production and consumption of music. Expects students to conduct a series of field exercises.

SOA 1301 Human Origins**4 QH**

Offers an intensive look at the data on fossil remains and contemporary primates, which are essential for an understanding of human physical and behavioral evolution. Efforts are made to bring the student into direct contact with primary materials. (II)

SOA 1303 Sexuality and Culture**4 QH**

Examines sexuality in a cross-cultural perspective including issues of sexual identity, the relationship of sexuality to the life cycle, sexual ideologies, and the links between sexuality and the reproduction of cultural norms. Topics include cross-cultural variation in sexual expression, sex and reproduction as commodities, sexuality and violence, sexually transmitted diseases and social policy. Compares sexuality issues in the United States to those of other cultures.

SOA 1310 Global Markets and Local Cultures**4 QH**

Discusses selected topics in the socioeconomic transformation of other cultures, including urbanization, industrialization, commodity production, and international labor migration. Focuses on the impact of capitalist development on contemporary third world and postcolonial societies; examines local responses to those changes.

SOA 1320 Anthropology Methods**4 QH**

Examines theory and practice of methods of field research and data analysis. Gives students the opportunity to take part in a field project.

SOA 1335 Language and Communication**4 QH**

Focuses on the anthropological study of linguistics. Presents basic theories of sociolinguistics and explores language in its social context. Includes animal communication; language learning; language and mind; cognitive and symbolic anthropology; the ethnography of speaking, speech, and boundaries; multilingualism; language and gender; language and ethnicity; language and social class; and pidgins and Creoles. Includes several field assignments.

SOA 1345 People in Cities**4 QH**

Studies urban life and urban problems, using international case studies. Addresses rural/urban and international migration, the relationship of urban settlement to employment patterns, the creation of inner-city or suburban ghettos or squatter settlements, and movements for city services in areas of spontaneous growth. Gives students the chance to design and implement a field project.

SOA 1356 The Anthropology of Law and Conflict**4 QH**

Examines settling disputes in stateless societies, forms and mechanisms of social control, law as an indicator of cultural and social norms, the study of conflict resolution as an ethnographic tool. Requires some field research and analysis.

SOA 1360 Economic Anthropology**4 QH**

Examines types of economic systems in simple societies: reciprocal, redistributive, market exchange; economic relations as part of social relations; land-tenure systems, credit systems, savings mechanisms. Analyzes the transition from subsistence to cash economics.

SOA 1420 Kinship and Society**4 QH**

Offers study for the advanced student only. Studies a variety of kinship systems, their terminological and structural components, and the way in which they articulate with other social institutions.

SOA 1425 Cultural Survival**4 QH**

Examines the problems faced by today's tribal peoples and national minorities. Using cross-cultural case studies, analyzes the relationship of governmental policies and economic development priorities to the survival of self-identified tribal cultures and minority populations throughout the world. Examines human rights, nationalism, and cultural autonomy, resistance, and self-determination.

SOA 1430, SOA 1431, SOA 1432, SOA 1433, SOA 1434, SOA 1435**4 QH each**

Area studies courses, including Latin America, the Caribbean, Africa, China/East Asia, India/South Asia, Southeast Asia, Mediterranean, Eastern Europe, that are offered as the department's resources permit.

SOA 1430 Latin American Society and Development 4 QH

Explores the processes of social, economic, and cultural change in Latin America. While concentrating on the present, traces class formation, agrarian structures, ethnic identity, ceremonial organization, gender roles, and political conflict since the colonial era in a range of countries. Emphasizes the relationship of communities and national political and economic systems. May emphasize Central America and Mexico or countries in South America through case studies.

SOA 1434 Contemporary Japanese Society and Culture 4 QH

See SOC 1104 for course description.

SOA 1470 Religion and Myth 4 QH

Focuses on nature and institutionalization of primitive, ancient, and contemporary religions. Explores religious concepts and movements in relation to social, religious, and political organization.

SOA 1704 Cultures of the World (Honors) 4 QH

Honors equivalent of SOA 1104.

SOA 1800, SOA 1801 Directed Study 4 QH

Offers independent work on a chosen topic under the direction of members of the department. Limited to

qualified seniors with approval of the department chair. *Prereq.* Department approval.

SOA 1820, SOA 1821, SOA 1822, SOA 1823 4 QH each**Junior/Senior Honors Program**

For details contact the Honors Office, 183 Holmes.

SOA 3100 Theory 4 QH

Qualified undergraduates can take this graduate school course, with permission of instructor.

INT 1340 Cultural Aspects of International Business 4 QH

Using a managerial perspective, covers issues that arise when a firm moves from its home country to a host country that may have a different national culture. Usually assumes the perspective of the United States-based firm that operates abroad, but spends some time on what happens to other national firms operating in the United States and in third-country environments. Analyzes the way in which "corporate culture" evolves, in the context of national culture and the impact on managers. *Prereq.* *Middler standing.*

Sociology

SOC 1100 Introduction to Sociology 4 QH

Explores basic concepts and theories concerning the relation between individuals and society. Emphasizes the influence of culture, social structure, and institutions in explaining human activity. Discusses and analyzes social groups, socialization, community, class, power, and social change, among other substantive issues.

SOC 1101 The Sociology of Everyday Life 4 QH

Examines the development, application, and consequences of rules for everyday activities (for example, walking, talking, eating, drinking, sitting, smoking, laughing, crying, and sleeping). Considers the effects of artifacts, culture, space, and territory on these activities, on social life, and on the expression of emotions.

SOC 1102 Social Inequality and Communication 4 QH

Analyzes the ways in which groups and institutions, in both their ritual and everyday activities, communicate the idea of hierarchy and an individual's place in it through face-to-face interaction, formal communication, and the use of space and time. Takes a dramaturgical approach to social organization, with special emphasis on status images in the media and the communication of social place by service organizations and professional groups. Includes some content analysis and observational fieldwork.

SOC 1103 American Society 4 QH

Focuses on American society, culture, and major social institutions: economic, religious, governmental, familial, educational, welfare, and recreational.

Examines social classes and stratification, mobility, and individualism. *Prereq.* *SOC 1100 or equiv.*

SOC 1104 Contemporary Japanese Culture and Society 4 QH

Focuses on contemporary Japanese urban society. Examines major values, family structure, sex roles, social control, the economy and the division of labor, mass media, religion, arts, and social problems. (See SOA 1434.) (IV)

SOC 1110 Society and Culture in the Soviet Union 4 QH

Focuses on contemporary Soviet society. Emphasizes the social, economic, and political reforms of the Gorbachev period and the ways in which the Soviet Union has evolved since 1917.

SOC 1120 Sociology of Boston 4 QH

Examines Boston from the perspectives of environmental development, neighborhood and intergroup relations, institutional services, and symbolic meanings. Explores current issues in the city through term projects. Requires field trips. *Does not meet elective requirement for sociology/anthropology major.*

SOC 1121 Doing Sociology 4 QH

Takes a research approach to sociology. Focuses on students' participation in their own learning about sociology as a body of knowledge and as a method of studying social life. Requires students to use the computer during the course. (II)

SOC 1125 Social Problems 4 QH

Analyzes five major sociological perspectives on social problems (pathology, disorganization, value conflict, deviance, and labeling). Examines the

conditions under which certain recurrent events, activities, and persons become redefined as social problems (for example, mine disasters, marijuana smoking, and alcoholism). Studies the typical responses to social problems and their consequences.

SOC 1135 Social Psychology 4 QH

Offers a sociopsychological approach to individual behavior in social contexts. Introduces basic concepts, such as socialization, identity, self-concept, role conflict, attitudes and attitude measurement, and groups and group processes. Surveys major theoretical orientations and important substantive topics.

SOC 1140 Sociology of Prejudice 4 QH

Examines factors in the development and maintenance of prejudice and discrimination. Discusses American race relations, anti-Semitism, sex roles, and stereotyping.

SOC 1145 Population and Society 4 QH

Examines traditional and contemporary approaches to human population and its control. Considers factors affecting birth and death rates; societal implications of population quantity and quality in several situations, past and present; rural-urban migration and mobility; racial, genetic, stratificational components for population analysis. Discusses public policies and responses to fertility control in several societies. Studies international efforts to understand and generate action on population issues. (VI)

SOC 1146 Environment and Society 4 QH

Examines the political economy of the global environmental crisis. Topics vary from quarter to quarter and include such issues as world resource availability, energy, pollution, ecological degradation in the Third World, environmental policy, and social movements. Involves practical experience in environmental problem solving. (VI)

SOC 1147 Cities and Society 4 QH

Focuses on the foundations of urban life in historical perspective. Analyzes relation of city life to environment, population, social organization, technology and cultural values. Examines growth trends, urbanization, urban planning, and citizen action. (Formerly Urban Society).

SOC 1150 Introduction to Women's Studies: Image, Myth, and Reality 4 QH

See INT 1150 for course description.

SOC 1155 Sociology of the Family 4 QH

Focuses on the family as a social institution in several selected cultures; interrelations of the family and political, economic, and educational institutions; social nature of personality; role taking; individualism, mobility, and industrialism. (V)

SOC 1156 Violence in the Family 4 QH

Examines physical, emotional, and sexual violence in families, with emphasis on child, sexual, and spouse abuse. Covers definitions, prevalence, causes, prevention, and treatment of specific cases of domestic violence. Focuses on social policy issues and problems of legal intervention in cultural and family issues.

SOC 1160 Sex-Gender Roles in a Changing Society 4 QH

Reviews and applies theories about the determinants of sex statuses and roles from historical and cross-cultural perspectives. Focuses on women's status in different institutions of American society.

SOC 1165 Students, Schools, and Society 4 QH

Emphasizes the role of education in processes of socialization, social mobility, social control, and social change. Do social characteristics (sex, race, class, age, physical status) influence the school experience? Do schools provide opportunity and initiate change, or do they perpetuate the status quo in economic, political, and social life? Who goes to school, where, for how long, and with what result? How does educational advantage or disadvantage get translated into jobs and social status? Encourages students to draw on their own experiences to develop paper topics.

SOC 1168 The Social Movements of the 1960s 4 QH

Considers the social and cultural movements of the 1960s and their origins in the Civil Rights movement. Examines the opposition to government policies and social norms that developed into the Civil Rights, student, New Left, antiwar, countercultural, and women's movements in order to understand their grievances, goals, composition, and impact.

SOC 1170 Race and Ethnic Relations 4 QH

Focuses on racial and religious groups, particularly with reference to the United States. Places special emphasis on historical development, specific problems of adjustment and assimilation, and specific present-day problems and trends. *Prereq.* SOC 1100 or equiv.

SOC 1171 Race and Ethnic Relations: A World Perspective 4 QH

Offers a cross-cultural analysis of race and ethnic relations in Western and non-Western societies. Examines race and ethnic relations in terms of contemporary developments, world problems, and ideological conflicts. (Formerly Comparative Race/Ethnic Relations).

SOC 1175 Sociology of Work 4 QH

Examines the varieties of work in American society, from blue collar to managerial and professional occupations. Considers job dissatisfaction and professional burnout, changing shape of the labor market, women and work, participation and humanization of work, the impact of computers. (VI)

SOC 1176 Sociology of Business/Industry 4 QH

Focuses on the role of industry in modern society. Examines similarities and dissimilarities among industrial societies, bureaucracy and its alternatives, unions, supervision democracy and manipulation, the worker on the assembly line, sabotage of the organization, and the role of wages and alienation.

SOC 1177 Social Roles in the Business World 4 QH

Analyzes the social structure of corporate and business life in contemporary America. Presents and discusses case studies from major accounting and/or industrial firms. Examines the "career line" in the

world of business and management, with a special focus on age/sex, racial/ethnic, and class/income barriers.

SOC 1178 Women Working 4 QH

Discusses the fact that differences in the labor force experience of men and women workers generally go unrecognized, and the work experience most common to women — household work — is rarely analyzed. Covers women's market and nonmarket activities, their rewards, and their problems, in addition to empirical and theoretical analyses of the work roles of women. Overall, underscores the differences between work experiences of men and women.

SOC 1180 Sociological Perspectives on Consumerism and Consumer Behavior 4 QH

Examines consumer-oriented issues, including interest groups, needs, values, institutional networks, decision-making processes, and situational impacts. Explores systemic benefits and costs of consumer-relevant actions.

SOC 1185 The Sociology of Deviance 4 QH

Explores the conditions under which people categorize others as different; processes by which persons so defined are assigned deviant status and assume appropriate roles and self-images; development of deviant careers and their relation to deviant subcultures; situations in which people transform deviant identity. (Formerly Social Deviance.)

SOC 1186 Social Control 4 QH

Examines formation of social bonds and the conditions under which they are ruptured, the emergence of deviance as an interactional problem, and individual and societal reactions to the most prevalent forms of deviant behavior. Analyzes agencies of social control, their definitions of problems, and responses to typical clients.

SOC 1190 Juvenile Delinquency 4 QH

Examines the sociological and psychological approaches to and their implications for a typology of delinquency. Discusses problems of prevention, treatment, and rehabilitation.

SOC 1195 Drugs and Society 4 QH

Offers an introduction to the sociology of drugs. First examines social definitions of drugs, conditions of their use, and socialization into drug use. Then considers deviant drug use and effects of social control on definitions and use. Considers a range of licit and illicit drugs, but gives major emphasis to alcohol, marijuana, and heroin.

SOC 1200 Sociology of Alcoholism 4 QH

Focuses on social responses to deviant alcohol use. Examines drinking cultures and drinking practices in the United States; processes by which people are labeled "alcoholics"; and the role of agencies of social control, such as the criminal justice system and the health care system, in labeling and in rehabilitation.

SOC 1201 Alcohol Use and Social Control 4 QH

Examines the conditions under which alcohol use disrupts social life; the processes through which

alcohol controls, informal and formal, come into being; the development changes and consequences of these controls. Includes case studies of Prohibition, regulation of the alcohol beverage industry, legal drinking age, drinking and driving, and public drunkenness.

SOC 1202 Sociology of Drinking 4 QH

Examines how different groups and societies organize drinking as a social act and the consequences of that organization. Singles out for particular attention the cultural meaning assigned to drinking, the social elements found in all drinking situations, how members of social groups learn how to drink, and the social and psychological functions of drinking.

SOC 1205 Law, Crime, and Social Justice 4 QH

Analyzes the impact of the legal system on the creation and perpetuation of criminality in contemporary American society. Devotes particular attention to the study of the creation of criminal law, the judicial process, and the role of law in the gap between crime and social justice. Arranges field trips to criminal arraignments, trials, and sentencing in the Boston Municipal Court and Suffolk Superior Court. Suitable for students in prelaw, criminal justice, political science, and allied fields.

SOC 1206 Class, Crime, and the Police 4 QH

Summarizes the major psychological, social, biological, economic, and political theories about the cause of crime. Then applies these theories to the daily operations of the police, courts, and prison system in the United States. Examines various attempts to lower the crime rate through such policies as "scared straight" programs, the death penalty, stricter and looser prisons, increased police presence, and behavioral conditioning.

SOC 1215 Medical Sociology 4 QH

Examines the professions, training, institutions, and problems in health care, with an emphasis on those in the United States. Considers practical issues in the improvement of health care systems. *Prereq.* SOC 1100 or permission of instructor.

SOC 1216 Health Care as a Social Issue 4 QH

Explores the social and political dynamics of health care: who benefits from the system and defends it, who works for change, who wins and why. Examines the social history of health care, occupational politics, community power structure and the health care setting, the planning and delivery of health services to "haves" and "have-nots," and the role of citizens in determining the future of health care through activism, lobbying, legislation, and participation in controlling the system. Provides case examples. *Prereq.* SOC 1100 or permission of instructor.

SOC 1217 Women, Health, and Social Change 4 QH

Examines how women have traditionally been viewed by the medical field and how reproduction and childbirth came to be defined as medical problems. Also examines the implications for women in the changes that have taken place in health care,

especially as these pertain to new reproductive frontiers and alternative health care facilities. Discusses the role of women in the health care professions.

SOC 1220 Sociology of Mental Health 4 QH

Surveys sociological perspectives on mental health and mental disorder. Uses discussions, readings, and presentations to explore the social history of mental illness, epidemiology, cross-cultural perspectives, patients' careers, social institutions of treatment, and policy implications. Examines areas of convergence between sociological concepts and psychiatry. *Prereq.* SOC 1100 or equiv.

SOC 1225 Aging and Society 4 QH

Surveys issues and questions on aging, with special attention to social and economic consequences of the aging process, including retirement and productivity, health care problems, nursing home residences, widower- and widowhood, and the approach of death. Presents examples relating to aging in other cultures in a search for new answers to social problems of aging in the United States. Gives students the opportunity to learn to anticipate, cope with, and even prevent problems of aging that concern self, family, and clients/patients.

SOC 1235 Death and Dying 4 QH

Focuses on the treatment of death and dying, including problems faced by health care professionals, family members, institutions, the funeral industry, and the dying themselves. Discusses cross-cultural perspectives, the social distribution of mortality, the changing nature of death, and the ethical problems in determining life and death with particular attention to such issues as abortion, suicide, and ceasing medical intervention. *Prereq.* SOC 1100 or permission of instructor.

SOC 1240 Sociology of Human Service Organizations 4 QH

Explores the contradiction between what human service organizations set out to do and what they actually accomplish. Also examines how the goals of human service organizations are defined, how clients become labelled, and the societal constraints on clients, workers, and human service organizations.

SOC 1245 Sociology of Poverty 4 QH

Analyzes American poverty in historical perspective, drawing on comparisons with other countries. Critically evaluates of sociological research and theories relating to poverty. Considers causes and effects of poverty, as well as societal responses to poverty and its consequences. Suitable for students in applied fields, such as nursing, criminal justice, education, allied health, premed, and prelaw.

SOC 1247 Food and Hunger 4 QH

Systematically examines the social causes and consequences of hunger and alternative approaches to solving world hunger.

SOC 1250 The Sociology of Private and Public Assistance 4 QH

Helps students understand why public and private assistance in the United States takes the form it does.

Examines the ideology behind the welfare system, the kinds of assumptions made about the poor, how other countries deal with the problem, the effects of poverty in the United States, and some explanations for its continuing existence.

SOC 1255 Sport in Society 4 QH

Analyzes the social origins and functions of leisure activities, with special emphasis on games and sports as forms of leisure. Gives considerable emphasis to cross-cultural and historical analysis, as well as to the relation between leisure activities and various social institutions—economy, polity, family, and religion. (See SOA 1255.)

SOC 1275 Sociology of the Arts 4 QH

Examines the relation between the social organization of society and the forms of art produced—the social role of the artist, how the arts are “manufactured” and distributed, the art consumer's relation to art and the artist, social support for the arts. Deals with a variety of art forms, with emphasis on the performing arts.

SOC 1276 Sociology of Popular Culture 4 QH

Presents a sociological analysis of popular culture, focusing on the relationship between pop culture and social institutions such as religion, the law, education, the economy, and the family; the organizations and artistic communities that produce pop culture such as the music industry, theatrical groups, advertising agencies; and the social roles and socialization processes associated with individual artists. Examines changes in popular culture from the viewpoint of changes in the larger society.

SOC 1284 Technology and Careers of the Future 4 QH

Focuses on new technologies and their social impacts on work and careers in the future. Examines sociological and humanistic approaches to technical change in the shop floor, offices, and professions. Also covers issues of design and control, health, employment, and autonomy.

SOC 1285 Technology and Society 4 QH

Discusses the following questions: Does society control technology or is technology directing society? Has technology become dehumanized? How valid is the doctrine of technological inevitability? Can the technological “fix” be viewed as a solution to social problems? Is technology itself a social problem? What can be expected of technology assessment? What of the back-to-nature and antitechnology movements today: are they the waves of the future? Expects students to do considerable independent study and research.

SOC 1286 Science and Society 4 QH

Recognizes that science has had profound effects on our society, and scientists have seen the ways in which political, economic, and social forces have guided developments in their fields. Explores issues such as “responsibility” and “autonomy” created by this interdependence. Emphasizes the social structures within which science operates and is communicated and science as an occupation and profession,

as well as a system of thought and set of tools for producing knowledge.

SOC 1287 Society Tomorrow: Forecasting Alternative Futures 4 QH

Introduces students to the area of "social futures" or "future studies." Examines the major techniques used to forecast futures and the specific scenarios and projections about the social world of tomorrow. Using the areas of energy and resources, robotics and the "information revolution," as well as modern weaponry and warfare, considers the major prospects and problems for society in the future.

SOC 1290 Military and American Society in a Nuclear Age 4 QH

Acknowledges that keeping out of war, winning war, and keeping peace have been major concerns during the past forty-five years. Investigates the relationship between military and society. Covers selected issues, including the impact of the military on social institutions such as the family, polity, and economy, the arms race and upheaval in social life, the legitimization crisis of the United States military, the role of women and minorities as reserve armies, and military spending and domestic social problems.

SOC 1300 Classical Social Thought 4 QH

Traces the development of sociology from the history of social thought. Examines the emergence of several schools, beginning with positivistic organicism and conflict theory. *Prereq.* Three sociology/anthropology courses.

SOC 1301 Current Social Thought 4 QH

Offers a seminar-lecture in which formalism, social behaviorism, social action theory, and functionalism are studied critically. *Prereq.* Three sociology/anthropology courses.

SOC 1302 Female Perspectives on Society 4 QH
(Formerly Feminist Perspectives on Society)

Examines a sampling of the burgeoning feminist literature in the social sciences and in theory, focusing on at least three major tendencies in this literature: radical feminism, socialist feminism, and neo-Freudian feminism. Discusses specific topics, including the origins and/or universality of women's oppression, women's work under capitalism, socialism and women's liberation, and family structure and the reproduction of gender. (VI)

SOC 1310 Class, Power, and Social Change 4 QH

Focuses on theories of social equality and inequality as applied to the exercise of power and large-scale social change. Required of majors. (V) *Prereq.* SOC 1100 and middler standing or permission of instructor.

SOC 1320 Introduction to Statistical Analysis 4 QH

Examines the application of the principles of measurement, probability, measures of centrality, tests of significance, and techniques of association and correlation to social data. *Prereq.* SOC 1100 or permission of instructor.

SOC 1321 Research Methods 1 4 QH

Introduces students to the research process through an examination of the rules of evidence in empirical research and the place of values. Gives students the opportunity to learn how to design and critique types of sociological research, how to collect qualitative and quantitative data, and how to sample populations. *Prereq.* SOC 1100 and SOC 1320, or permission of instructor.

SOC 1322 Research Methods 2 4 QH

Requires students to complete the research project begun in SOC 1321. Focuses on practice coding, building indexes, scaling, table construction; introduction to use of the computer. *Prereq.* SOC 1100, SOC 1320, and SOC 1321, or permission of instructor.

SOC 1323 Qualitative Research Methods 4 QH

Offers an introduction to sociological fieldwork—methods of gathering data by extended observation of and interaction with people in natural settings. Requires students to take part in a series of observations designed to teach the basic skills of open-ended interviewing, observing, recording, and analyzing data. Focuses on the theoretical base, which will be symbolic interaction.

SOC 1324 Human Services Research and Evaluation 4 QH

Covers basic issues in applied research and the evaluation of services, including the purposes of evaluation, ethics, formulating questions and measuring answers, designing evaluations and planning oriented research, utilizing evaluation results, and the turbulent setting of action programs. Suitable for students majoring in human services, sociology, psychology, nursing, health education, and related fields. *Prereq.* SOC 1320 or other statistics, SOC 1240, or permission of instructor.

SOC 1335, SOC 1336 Group Behavior 1, 2 8 QH
(Formerly Group Behavior—The Sociological Imagination)

Explores how individuals interact in groups and how groups interact with each other. Focuses on the reflexive self, social aspects of language, situational learning, group perspectives, careers, institutions, and worlds.

SOC 1337 Seminar in Social Psychology 4 QH

Focuses on the interaction of psychological and group processes. Requires students to read original theoretical and research monographs in the field. Includes such topics as prejudice, reference groups, sex roles, conformity, leadership, aggression, communication, collective behavior, and achievement.

SOC 1345 American Demographics 4 QH

Offers an applied research experience in which students have the opportunity to study the major areas of demography. focuses on the resources of the United States Census Bureau and, in particular, the data products available from recent census surveys.

SOC 1346 Suburb and Metropolis**4 QH**

Explores ecology of suburban and metropolitan growth, impact on center city and rural fringe, emergent lifestyles and institutional forms. Compares interdependence, issues of identity, autonomy, and accessibility. Analyzes different types of metropolitan political, social, and economic institutions. Considers prospects for regional action. *Prereq.* SOC 1100 or equiv.

SOC 1347 Community Analysis**4 QH**

Explores types of human settlements, focusing on the interaction between people and their political, economic, and social environments. Discusses power structure and citizen action to influence institutions; skills in community analysis, including use of documents, survey, observation, and evaluation of needs and resources; strategies of conflict, cooperation, and negotiation to attain community and group ends. *Prereq.* *Permission of instructor or three sociology/anthropology courses.*

SOC 1348 Seminar in Urban Studies**4 QH**

Compares interdisciplinary approaches to urban studies according to problem areas and research methods. Gives students the opportunity to extend previous term paper projects after exposure to social action and social systemic theoretical perspectives. *Prereq.* SOC 1147 or permission of instructor.

SOC 1355 Political Sociology: Who Gets What**4 QH**

Examines formal political structures and informal quasi-political groups. Focuses on sociological analysis of ideology, class politics, mass movements, and the conflict of various social and economic groups as they vie for political power and influence. *Prereq.* *Permission of instructor or four sociology/anthropology courses.*

SOC 1360 Social Stratification: Class, Status, and Power**4 QH**

Focuses on theories of social inequality, concepts of social class, aspects of status and role difference, criteria for social mobility. *Prereq.* *Permission of instructor or four sociology/anthropology courses.*

SOC 1365 Collective Behavior**4 QH**

Focuses on the rise of new group forms in response to persistent social unrest; masses, crowds, and publics; specific instances of collective behavior such as race riots, wildcat strikes, prison revolts, and campus disorders.

SOC 1375 Sociology of Occupations and Professions**4 QH**

Focuses on the meanings of work; division of labor and specialization; analysis of occupational structure and patterns of recruitment, training, and career preferences; the classic professions and new trends in professionalization. *Prereq.* *Permission of instructor or four sociology/anthropology courses.*

SOC 1376 Organization and Bureaucracy**4 QH**

Focuses on sociological study of organizations. Examines case studies of private corporations, federal bureaucracies, social service agencies, military-industrial complex, high-risk technological systems,

unions. Analyzes recent theories of innovation, participation, and opportunity in complex organizations.

SOC 1385 Social Deviance 2**4 QH**

Examines the leading theories of deviance (anomie, subcultural deviance, labeling) and their principal variants; studies their assumptions, conceptions, propositions, and supportive evidence; analyzes empirical studies in each theoretical tradition.

SOC 1405 Sociological Theories of Crime**4 QH**

Explores patterns and social forces involved in criminal behavior. Analyzes of sociological theories of criminality and comparison of these with other explanations of crime.

SOC 1470 Sociology of Religion**4 QH**

Offers a comparative and analytic treatment of religion as a social institution, focusing on the relations between religious organizations and other social institutions, with particular emphasis on the American experience. Analyzes religion as an agent of social change and stability. *Prereq.* SOC 1100.

SOC 1475 The Sociology of Mass Communication**4 QH**

(Formerly Mass Communication and Public Opinion)

Focuses on factors in the formation and development of public opinion, the effect of television on children, mass communication as social organization, media-depicted images of society, the role of personal influence, the process of rumor, the use of mass media by the poor, propaganda analysis, and the latent and manifest functions of mass communication.

SOC 1485 Computers and Society**4 QH**

Examines the impact of the computer revolution on the conditions of work and life in contemporary society including legal and theoretical issues. Discusses ethical and professional issues in computer use. (VI) *Prereq.* *Junior in computer science or middler with ability to program.*

SOC 1500 Applied Sociology: Practice and Theory**4 QH**

Analyzes the conditions under which sociological knowledge is applied to social problems, the kinds of problems, and the degree of effectiveness of this application. Pays particular attention to research and demonstration projects that derive from sociological theory.

SOC 1501 Social Policy and Social Intervention**4 QH**

(Formerly Social Control 2)

Focuses on study of the formation of social policies in response to social problems; analyzes policies and problems, supporters and opponents of policy change, conditions under which control agencies adopt new policies, and effects of policy change. Places particular emphasis on case studies of social action and legal change.

SOC 1525 Comparative Human Services 1**6 QH**

Offers an intensive look at the American human services system. Gives upper-level undergraduate and graduate students the opportunity to study the origins, development, and present state of human

services in the United States. Involves lectures as well as field visits in the Boston area. Provides independent study.

SOC 1526 Comparative Human Services 2 4 QH

Offers an intensive study of the British human services system. Provides students the opportunity to immerse themselves in the social and cultural context of British human services and involves field trips in London designed to examine firsthand the planning, administration, and delivery of human services in Great Britain.

SOC 1535 Seminar in Social Welfare 4 QH

Discusses problems in social welfare observed in the term between "Problems" and "Practicum." Requires a research paper, based on directed fieldwork in the intervening term.

SOC 1600 Senior Seminar 4 QH

Provides students the opportunity to analyze, from sociological perspectives, student experience in work and voluntary service and to develop and extend research interests related to that work or action experience. *Prereq.* Senior standing in sociology/anthropology or permission of instructor.

SOC 1601 Seminar in Current Emphases in Sociology 4 QH

Reviews and discusses selected sociological topics. *Prereq.* Junior or senior standing in sociology/anthropology or permission of instructor.

SOC 1602 Seminar in Current Emphases in Sociology: Writing and Talking in Sociology 4 QH

Considers prevailing modes of presentation in major journals and verbal presentation in teaching, consulting, for example. Requires class members to submit examples of their own writing for analysis. *Prereq.* Junior or senior standing in sociology/anthropology or permission of instructor.

SOC 1700 Introduction to Sociology (Honors) 4 QH

Honors equivalent of SOC 1100.

SOC 1710 Class, Power, and Social Change (Honors) 4 QH

Honors equivalent of SOC 1310. Any Honors Program member is eligible to enroll in this course.

SOC 1800, SOC 1801, SOC 1802, SOC 1803 4 QH each
Directed Study

Offers independent work on a chosen topic under the direction of members of the department. Limited to qualified students with approval of department chair. *Prereq.* Junior or senior standing in sociology or permission of instructor.

SOC 1821, SOC 1822, SOC 1823, SOC 1824 4 QH each
Junior/Senior Honors Program

For details contact the Honors Office, 183 Holmes.

INT 1150 Introduction to Women's Studies: 4 QH
Image, Myth, and Reality

Surveys the issues and methodology involved in the interdisciplinary study of women. Encompasses the historical, political, economic, and social processes that have created both the image and the reality of

women in society. Through guest lecturers, provides an overview of the many different disciplinary approaches to the study of women. Required for women's studies minors and may be used either as a general elective or, depending on the discipline of the coordinator, to satisfy specific concentration requirements. (II)

INT 1151, INT 1152 Women's Studies: 4 QH
Seminars in Research

These interdisciplinary women's studies seminars allow students to address problems in depth by researching a topic of particular interest. Working closely with the seminar professor or another appropriate faculty member, students choose a research problem and develop a research design and methodology. Opportunities are provided for sharing work in progress and for exchanging findings. The final product of the seminar is a major paper. These seminars are required for women's studies minors.

INT 1201 An Analysis of American Racism 4 QH

Discusses the cycle by which racism in our institutions helps form our attitudes and the manner in which those attitudes shape our institutions. Emphasizes is on the practical, day-to-day aspects of racism, rather than the theoretical and historical aspects.

INT 1215 Into the Ocean World 4 QH

Offers a comprehensive interdisciplinary introduction to the oceans. Focuses on the seas' complexity and the far-reaching consequences of our interactions with them. Uses a teaching team consisting of specialists in the sciences, social sciences, humanities, and arts, each with an interest in marine issues and a commitment to bridging the gaps among disciplines. Considers themes as broad as the oceans, but, when appropriate, focuses on Boston Harbor, a first step into the ocean world for those of us in this area.

INT 1400 Professional Practices: Individual and 4 QH
Social Dimensions

Explores the dimensions and dilemmas of freedom and responsibility confronting professional people practicing within limits set by socioeconomic conditions, by clients, and by other professionals. Examines case histories to illustrate the dilemmas professionals face, the choices made, and the consequences these have on the freedom of the practitioner, and on personal and professional integrity.

INT 1401 Health Professions: 4 QH
Past, Present, Future

Focuses on social history of the modern health professions. Explores long-range patterns in the organization and regulation of the health professions, beginning with the Middle Ages and emphasizing the Jacksonian period, industrialization, modern professional organizations, the growing role of the state, responses of the health professions, and the future of health care in the United States under various corporate/government schemes for reorganization and "accountability."

Speech Communication

Some courses in the College of Arts and Sciences are duplicated in different departments or colleges or within a department. You may not receive credit for two such courses. If you have a question about whether one course overlaps another, please consult the departments involved and the Office of the Dean before taking the course.

Numbers inside parentheses within course descriptions refer to core curriculum categories listed on page 2.

SPC 1110 Voice and Articulation

4 QH

Focuses on voice technique. Emphasizes pitch, projection, articulation, and vocal variety. Combines theory and practical application.

SPC 1111 Oral Interpretation

4 QH

Focuses on application of basic vocal techniques to the dramatic reading of prose, poetry, and drama. Discusses that, through literary analysis, the author's meaning is understood and, by means of oral reading skills, communicated to an audience.

SPC 1115 Introduction to Communication Skills

4 QH

Focuses on the communication process and its function as a means of relating to the world, ourselves, and other people. Examines factors in intra- and interpersonal communication, group communication, and public speaking through lectures, discussions, structured learning experiences, and written assignments.

SPC 1116 Business and Professional Speaking

4 QH

Focuses on practice of oral presentations, group communication, conference and discussion techniques, interview methods, and occasion speaking. Combines performance aspects with case study methods of communication on the professional level.

SPC 1210 Advanced Voice and Articulation

4 QH

Develops and applies vocal techniques acquired in SPC 1110. Emphasizes on vocal analysis, flexibility, and regional patterns of speech. *Prereq.* SPC 1110 or permission of instructor.

SPC 1211 Advanced Oral Interpretation

4 QH

Provides the opportunity to develop further oral reading skills acquired in SPC 1111. Includes work with accents and dialects, study of reader's theatre, and an investigation of classical and modern philosophies of the art. *Prereq.* SPC 1111.

SPC 1232 Female-Male Communication

4 QH

Surveys the various dimensions of female-male relations as they are created, sustained, or disintegrated through communication transactions. Emphasizes the various images and stereotypes of male and female sexual identity as they affect and are affected by communication in the development of hostility, friendship, or intimacy. Examines temporary, permanent, and destructive female-male relations as they lead to alternate lifestyles.

SPC 1239 Argumentation and Debate

4 QH

Helps develop skills in rational decision making through advocacy. Gives attention to logical reasoning, psychological methods, and motivational techniques. *Prereq.* SPC 1115, SPC 1116, or permission of instructor.

SPC 1240 Competitive Strategies in Oral Communication

4 QH

Focuses on teaching and coaching techniques in intercollegiate speech competition. Concentrates on speech researching, writing, and criticism. Encourages students involved in speech competition or those studying fields that require competence in presentational skills. *Prereq.* SPC 1115 or permission of instructor.

SPC 1250 Introduction to Mass Communication

4 QH

Explores the many media through which people express themselves: radio, television, film, print, music. Pays attention to the role of the individual as a media consumer.

SPC 1300 Introduction to Communication Theory

4 QH

Offers basic knowledge and understanding of the processes involved in the transference of meanings. Discusses the problems involved in defining communication and the nature of communication. Examines various models of communication. Considers the nature of theory and requirements of adequate theory. Examines various theories of human communication, including psychological, sociological, information, and system theories.

SPC 1310 Rhetorical Theory I

4 QH

Examines various theories of rhetoric, starting with the early Greeks (Plato's "Phaedrus" and "Gorgias," Aristotle's "The Rhetoric"), progressing through the rhetoric of Rome (Cicero's "de Brute" and Quintilian's "de Institutione"), and moving into a brief synopsis of medieval rhetoricians (Peter Ramus, Thomas Wilson, Thomas de Quincey, Francis Bacon, George Campbell, Richard Whately). Focuses on the student's growing knowledge and appreciation of the history and principles of rhetoric, which are the foundation of oral discourse. *Prereq.* SPC 1115 and SPC 1250.

SPC 1315 Theories of Persuasion**4 QH**

Surveys theoretical and conceptual approaches and research pertaining to the effectiveness of communication that is intended to induce deliberately changes in attitudes, beliefs, values, and/or behavior.

SPC 1317 Theories of Audience Behavior**4 QH**

Surveys theoretical models, concepts, and research. Focuses on the role of the receiver as an active participant in the communication process. Considers individual information processing; listening as a learned behavior; intra-audience effects; relations between media and audience characteristics; dissemination, rumors, and information; and the development of societal norms and mores.

SPC 1318 Negotiation Skills**4 QH**

Investigates the skills involved in bringing matters to mutually acceptable settlements; applies those skills through lectures, discussions, and especially through performance in case studies and role-playing simulations. Includes such personal, professional, and governmental processes as conflict resolution, problem solving, and advocacy. Places particular emphasis will be placed on the collective bargaining process in the private and public sectors, including negotiation, mediation, and arbitration. *Prereq. Middler standing or higher or permission of instructor.*

SPC 1330 Interpersonal Communication I**4 QH**

Focuses on the communication process. Examines the ways in which we relate to other individuals and factors that influence these processes.

SPC 1331 Interpersonal Communication 2**4 QH**

Focuses on application of concepts developed in SPC 1330. As an experiential course, explores ways of becoming more aware of one's self and one's relationships with others and examines various options for communicating and increasing knowledge of the group process. Enrollment limited. *Prereq. SPC 1330 or permission of instructor.*

SPC 1338 Group Discussion**4 QH**

Expects students to work in task groups to explore theory and research in the area of group dynamics and to apply their knowledge to the classroom experience as they work on developing skills in decision making, problem solving, membership, and leadership.

SPC 1410 Contemporary Public Address**4 QH**

Offers a critical study of the public address skills of leading contemporary speakers representative of important political and social movements. Helps students gain an appreciation of the dimensions and varieties of contemporary public address, broadly defined as symbolic discourse. Analyzes various theories and approaches to public address, examines rhetorical situations; critically evaluates the use of agitative and control strategies to accomplish social change.

SPC 1415 Persuasive Techniques**4 QH**

Offers a critical, in-depth analysis of instances of persuasion as they occur in social interaction, social movements, politics, and advertising; the practical

strategies employed; and the factors that influence the effectiveness of those strategies when persuaders attempt to influence others. *Prereq. SPC 1315 or permission of instructor.*

SPC 1430 Organizational Communication**4 QH**

Examines the nature of communication in the context of complex organizations. Explores both internal and external organizational communication. Analyzes communication networks, communication technologies, interpersonal communication modes, organizational interdependencies, and their effects on information transfer and diffusion. Includes a section on organizational communication assessment and communication program implementation. *Prereq. SPC 1250.*

SPC 1431 Mass Communication and the Organization**4 QH**

Explores advanced applications of mass communication to organizational communication problems. Reviews the principles of mass communication and organizational communication and evaluates different message diffusion strategies used in organizations. Includes problem analysis and student presentation. *Prereq. SPC 1250 and SPC 1430.*

SPC 1437 Consultation Skills**4 QH**

Gives students the opportunity to acquire the skills necessary to analyze communication difficulties in industry, organizations, and groups. Includes theory discussion, practice, and feedback, using case study method. *Prereq. SPC 1115, SPC 1300, SPC 1330, and SPC 1338.*

SPC 1450 Television I**4 QH**

Introduces the student to the equipment of a broadcast studio, surveys broadcast production techniques, and provides opportunities in class for applied practice through the production of programming suitable for broadcast. *Prereq. SPC 1250 or permission of instructor.*

SPC 1451 Foundations of Broadcasting**4 QH**

Surveys the history, technology, and governmental regulation of broadcasting in the United States, as compared to other systems internationally. Describes the evolution of the medium, beginning with the 'wired' communication systems of Bell and Morse, the use of radio first for point-to-point communication and its growth into a mass medium, and finally, the post-World War 2 explosion of the television industry. Focuses on major personalities—inventors, corporation founders, and political leaders. Examines quarrels and resolutions in the context of the historical and contemporary state of the broadcasting industry. *Prereq. SPC 1250.*

SPC 1452 Radio I**4 QH**

Focuses on the role of the producer/director in the creation, preproduction planning, and execution of local and network radio programs. Emphasizes live broadcasts and live assembly of partially prerecorded programs. Spends a great deal of time on the written materials necessary for program planning. Also spends some time in the studio working on

model program production and, possibly, actual live music performance broadcasts. *Prereq.* *Permission of instructor.*

SPC 1453 Broadcast Management 4 QH

Examines four key areas that inform management practices: economics, FCC regulatory policies, external marketplace forces (competition), and internal organizational forces (people). Applies this understanding of contemporary management practices to case studies. *Prereq.* *SPC 1250 and middler status or above.*

SPC 1454 Programming for Radio and Television 4 QH

Focuses on the structure in which the programmer operates and the motivation for programming strategies. Examines practical components of the marketplace, such as ratings, public TV, contemporary radio, and deregulation. *Prereq.* *SPC 1250 and middler status or above.*

SPC 1455 Television 2 4 QH

Examines the history of the business of the television industry and endeavors to sharpen each student's ability to solve and criticize complex creative problems. Expects students to write convincing program treatments, analyze audience data, become well versed in current issues in the industry, and finish at least two television pieces. *Prereq.* *SPC 1250 and SPC 1450.*

SPC 1500 Special Topics in Speech Communication 4 QH

Offers an in-depth examination of a subject of particular significance to the field. *Prereq.* *Permission of instructor.*

SPC 1554 Special Topics in Broadcasting 4 QH

Introduces the student to the variety of roles played by broadcast professionals and to the interplay of professional functions integral to the broadcast industry. Focuses on a different aspect of the broadcast industry each term. *Prereq.* *SPC 1250 or permission of instructor.*

SPC 1555 Communication and the Quality of Life 4 QH

Offers students an opportunity to develop a meaning of the concept "quality of life" and to gain knowledge of subjective and objective methods for measuring and assessing that concept. Identifies, explores, and analyzes problems in professions that influence quality of life; evaluates possible solutions.

SPC 1600 Introduction to Communication Research 4 QH

Focuses on scientific method and epistemology as they apply to the investigation of communication phenomena. Assists students in finding and critically evaluating literature dealing with factors that influence the effectiveness of communication and that may be pertinent to either academic projects or managerial decision-making. *Prereq.* *SPC 1300 or permission of instructor.*

SPC 1610 Rhetorical Criticism 4 QH

Focuses on the principles of rhetorical analysis: theories, methods, and their application to discourses. Studies various types of discourse throughout the quarter. Pays attention to understanding various methods and problems in rhetorical analysis. Examines judgment criteria, as well as the role of rhetorical criticism in society. *Prereq.* *SPC 1310.*

SPC 1890, SPC 1891, SPC 1892 4 QH each
Directed Study

SPC 1895, SPC 1896 Internship in Speech Communication 4 QH

Provides students with the opportunity to gain academic credit for on-the-job training in an allied career field. Requires prior approval by a department committee, demonstration that the job allows opportunities to apply theoretical understanding to specific application in the work environment, and faculty advisement as well as on-the-job supervision.

Theatre and Dance

Numbers inside parentheses within course descriptions refer to core curriculum categories listed on page 2.

DRA 1100 Introduction to Theatre Arts 4 QH

Provides a brief view of the historical development of acting, directing, and production design. Emphasizes appreciation of contemporary theatrical forms. (II)

DRA 1106 Theatre History—Beginnings to Renaissance 4 QH

Explores the history of the theatre and its development in the West, focusing on Greece, Rome, Medieval Europe, Golden Age Spain, and Elizabethan and Stuart England. (Can be taken independently of DRA 1107.)

DRA 1107 Theatre History—Renaissance to Naturalism 4 QH

Focuses on the development of theatre in the Italian Renaissance; the spread of Italianate forms throughout Europe during the seventeenth and eighteenth centuries; the rise of Romanticism in Germany and its spread; and the rise of realism and naturalism in France, Scandinavia, and throughout Europe. (Can be taken independently of DRA 1106.)

DRA 1112 Drama Theory/Criticism 4 QH

Examines the major historical statements of drama theory and contemporary drama criticism as evi-

denced in journalistic play reviews. Requires students to prepare reviews of local productions.

DRA 1114 Masters of the Theatre 4 QH
Overviews several great practitioners of theatre. In particular, stresses how society influenced the thought and craft of playwrights, actors, directors, designers, and theorists. Pays careful attention to how the play's ideas are translated into performance. Uses video and live performance, when possible, as integral elements in the course. (III)

DRA 1116 The American Theatre 4 QH
Focuses on the American theatre from the Revolutionary War to the present.

DRA 1117 The Theatre of Williams, Miller, and Albee 4 QH
Offers an intensive study of the works of three major post-World War II American playwrights.

DRA 1118 Black Theatre in America 4 QH
Surveys the history of black theatre artists in America from the time of Ira Aldridge to the present day. Also examines the works of black playwrights from the Harlem renaissance to the present, with an emphasis on the period beginning with Baraka's *Dutchman*.

DRA 1121 Contemporary Theatre 4 QH
Examines the current state of commercial, regional, and other noncommercial theatre in the United States, using readings, lectures, reports, and weekly visits to theatre productions in the area. Explores through lectures the background of these types of theatre in twentieth century American and European theatre.

DRA 1122 Twentieth-Century European Theatre 4 QH
Examines major twentieth-century European attempts to break away from the nineteenth-century realistic tradition. Explores representative works of expressionistic, symbolistic, epic, and absurd theatre artists.

DRA 1123 The Theatre of Ibsen, Strindberg, and Chekhov 4 QH
Offers an intensive study of the theatre of the three great masters of the naturalistic movement in Europe whose works stand as the foundation of modern drama.

DRA 1124 The Irish Theatre 4 QH
Focuses on theatre and drama in Ireland from their beginnings to the present, with the backgrounds of Irish folklore and history. Emphasizes developments in the twentieth century.

DRA 1125 The Theatre of the Absurd 4 QH
Focuses on the theatre of the absurd as an anti-literary reflection of and reaction to life and its effects on Western drama. Focuses on selected works and ideas of Jarry, Artaud, Camus, Sartre, Beckett, Genet, Ionesco, Pinter, Kopit, Brown, and Arrabal.

DRA 1127 The Comic Theatre 4 QH
Surveys theatrical comedy from the ancient Greeks to the present. Examines the comic playwright, the "joke writer," the comic director, the comedic actor,

and the standup comedian. Discusses theories and techniques of laughter, as well as the psychological and sociological benefits derived from laughter. Includes reading playscripts by Aristophanes, Molière, Shakespeare, Shaw, and Simon as well as viewing and listening to tapes of Chaplin, the Marx Brothers, and others. Examines comedy devices through lectures, films, records, and attending live performances.

DRA 1130 Eastern European Theatre and Drama 4 QH
Surveys the history of theatre and drama in Russia and Poland from the nineteenth century to the present. Emphasizes the contributions of Polish romanticism, developments in the Soviet theatre of the 1920s, and the work of major Polish and Russian dramatists and theatre artists who have influenced Western theatre profoundly.

DRA 1140 Playwriting I 4 QH
Emphasizes the principles and practices of modern dramatic composition: characterization, plot, plot structure, dialogue, and other dramaturgical elements as seen in the one-act play. Includes the writing of brief scenes, the dramatic composition, and the one-act play.

DRA 1149 Script Analysis for the Stage 4 QH
Aids the theatre practitioner in developing the skills necessary for analyzing scripts in preparation for production. Focuses on dramatic theory and structure and theatrical techniques that will enable an actor, director, designer, or playwright to uncover the problems of translating theory into practice.

DRA 1150 Introduction to Acting 4 QH
Focuses on fundamental techniques of stage use, the actor and the stage environment, and improvisations for strengthening imagination and increasing freedom. Analyzes scripts for work on performed scenes.

DRA 1155 Voice for the Theatre 4 QH
Focuses on vocal exercises that enable the actor to better connect with the voice through freeing the physical and emotional self. Emphasizes centering, physicalization, breath support, articulation, resonance, projection, and relaxation. Includes selected monologues and/or scenes for classroom analysis.

DRA 1160 Movement I 4 QH
Emphasizes using the body as an expressive instrument for Realism. Develops concentration, control, and stamina through exercise, relaxation, improvisation, manipulation of energy flow, rhythms, and imagination. *Prereq.* Theatre major or permission of instructor.

DRA 1180 Concepts of Direction 4 QH
Examines theories of dramatic presentation through analysis of selected historical developments. Focuses on purposes and techniques of theatrical direction related to script analysis, production style, pictorial composition, rhythmic evolution, and empathic responses. *Prereq.* DRA 1150 and DRA 1212.

DRA 1200 Stagecraft**4 QH**

Focuses on principles that underlie the coordination and execution of technical production. Examines different kinds of scenery, tools, equipment, construction materials, and lighting techniques. Lab work involves preparing technical elements of University productions.

DRA 1209 Theatrical Drafting**4 QH**

Through work on supervised classroom projects, exposes the student to the basic graphics language needed to translate a designer's ideas into technical drawings used for construction. *Prereq.* DRA 1200.

DRA 1210 Scenic Design for the Stage**4 QH**

Introduces the theory and practice of theatrical design and the role of the designer in the production process. Through project work, examines the use of the graphics tools—line, form, balance, color, rhythm, etcetera—in the development of the design idea. Emphasizes understanding and utilizing spatial relationships, visually expressing conceptual themes, and understanding the various uses, problems, and practical considerations of proscenium, thrust, and arena staging. Analyzes historical production styles from the Greco-Roman period through the nineteenth century. *Prereq.* DRA 1200, DRA 1212, or permission of instructor.

DRA 1212 Introduction to Theatrical Design**4 QH**

Introduces the visual effects of modern theatrical production and the creative processes by which these come into being, through a basic survey of the three major design disciplines, their supporting technology, and their working interrelationship. Addresses the questions of how artistic concepts are developed and related, how they are communicated to other artists and an audience, and how one develops the critical processes necessary to evaluate these concepts.

DRA 1213 Scene Design 2: Principles**4 QH**

Focuses on the development and expression of conceptual statements from specific dramatic texts through a series of exercises involving script analysis and introductory work in rendering and model construction. Examines texts selected from works of distinct historical and stylistic periods. Studies the heritage of twentieth-century theatrical design through the work of artists such as Appia, Craig, Jones, Urban, and Oenslager. Emphasizes the development of such stylistic treatments as realism, expressionism, symbolism, and constructivist and environmental design. *Prereq.* DRA 1210.

DRA 1214 Scene Design 3: Techniques**4 QH**

Focuses on the practical application of the theories, materials, and techniques of contemporary design. Emphasizes furthering the student's ability to research a project as well as executing perspective drawings, renderings, and painter's elevations. Bases assignments in critical analysis on various contemporary American and European production of dramatic and operatic works. Discusses the work of such influential designers as Aronson, Bay, Mielziner, and Svoboda as well as the contributions of such

nontheatre artists as Chagall, Dali, and Picasso. *Prereq.* DRA 1213.

DRA 1225 Scene Painting**4 QH**

Traces the history of scene painting and ornament from classical to contemporary times. Focuses on studio organization, color, color theory, equipment, tools, materials, and costs involved with painting stage scenery. Uses projects and exercises in the use of different media, matching colors, painting of textures, light and shade, and the use of stencils and physical textures. Includes lab sessions involving painting stage scenery for University productions. *Prereq.* DRA 1200 or permission of instructor.

DRA 1226 Lighting Design for the Stage**4 QH**

Examines basic principles and practices of stage lighting, including the qualities and functions of light, lighting instruments and controls, basic electricity, color in light, and analysis of the script in terms of light requirements. Expects students to develop light plots and schedules for various kinds of stage productions. Includes lab work on lighting crews for University productions. *Prereq.* DRA 1200, DRA 1212, or permission.

DRA 1246 Sound for the Theatre**4 QH**

Beginning with a basic introduction to both natural and electronically produced sound, goes on to discuss the component parts of sound systems, their theories, and their applications. Discusses and demonstrates techniques of recording and editing, with particular reference to the creation of sound tracks and effects for theatrical productions. Explores the concepts of sound-reinforcement systems for musicals, concerts, and other current professional applications.

DRA 1261 Costuming 1**4 QH**

Presents the beginning designer with the opportunity to investigate costume design theory and to foster perceptual development. Through lectures and projects, gives students the opportunity to explore both the abstract and historical aspects of costume design as well as textual analysis and its conceptual implications. (Does not require prior art or design education.)

DRA 1265 Pattern Drafting and Costume Construction**4 QH**

Develops the skills and techniques necessary for the patterning, cutting, and construction of costumes for the stage. Covers flat pattern drafting, draping, and finishing techniques.

DRA 1280 Stage Makeup**4 QH**

Focuses on the principles of, the reasons for, and the materials used in makeup for the theatre, television, and films. Includes the practical application of types and styles of makeup—straight, old-age, character, and corrective.

DRA 1284 Theatre Management**4 QH**

Focuses on theatre management, including problems of financing, promoting, and programming for educational, community, profit, and nonprofit professional theatre.

DRA 1292 Children's Theatre 4 QH

Focuses on theories and methods of creative techniques related to children's programs in schools, churches, and recreational facilities. Analyzes literature in preparation for production of children's plays.

DRA 1300 Acting 2 4 QH

Focuses on developing the actor's sense of truth and emotional freedom. Emphasizes creating, developing, and sustaining character and developing ensemble. Includes monologues and scenes performed for classroom analysis. *Prereq.* DRA 1150 or permission of instructor.

DRA 1301 Acting 3 4 QH

Focuses on further development of the actor's tools, script and character scoring, and exercises for physical and psychological freedom. Includes in-class scenes from works in progress. *Prereq.* DRA 1300.

DRA 1302 Acting 4 4 QH

Deals with scene work from a spectrum of theatrical genre. Focuses on developing a technique for approaching a role through research, character, and language. *Prereq.* DRA 1301 or permission of instructor.

DRA 1316 Acting for the Camera (Television) 4 QH

Presents the fundamentals of camera acting, adjusting the actor's physical responses to the mechanical eye of the camera and the delicate ear of the microphone. Involves studio work before the television camera to explore the genres of dramatic, commercial, and industrial acting. *Prereq.* DRA 1150, DRA 1155, DRA 1160, DRA 1300, DRA 1301, and DRA 1302.

DRA 1325 Musical Theatre Technique 4 QH

Applies acting technique to the performance of musical material. Explores song through text and character progression, develops a process for approaching a song, and synthesizes movement, gesture, and emotion with melody, rhythm, and lyrics. Involves student performances of solo, small ensemble, and large ensemble material. Does *not* involve singing technique. *Prereq.* DRA 1150, DRA 1300, or permission of instructor.

DRA 1350 Problems in Direction 4 QH

Presents experimentation in theory related to the staging of classical and modern drama. Analyzes plays in actual production: casting, rehearsals, character interpretations. Requires that each student be responsible for the production of a one-act play. *Prereq.* DRA 1180.

DRA 1370 Rehearsal and Performance 4 QH

Allows students to participate in public performance through preparation and rehearsals in areas of acting, directing, design, and stagemanaging. *Prereq.* Permission of instructor.

DRA 1400 Costuming 2 4 QH

Offers advanced study in textual interpretation and its application to costume design. Emphasizes conceptual and stylistic development through assigned projects in the various genres of the performing arts. *Prereq.* DRA 1261 or permission of instructor.

DRA 1410 Technical Production 4 QH

Allows the opportunity to acquire and explore the requisite skills for developing working drawings and budgetary analyses for theatrical productions. Focuses on several projects and includes the opportunity to coordinate one substantial production. Requires that the specialized study be executed in close supervision with the instructor. *Prereq.* Completion of all courses stipulated in production/design concentration and permission of instructor.

DRA 1420 Advanced Drafting and Construction 4 QH

Offers specialized study in technical production techniques. Covers drafting procedures necessary for the conversion of designer's drawings into detailed rear elevation and construction layouts, as well as the development of section, isometric, and oblique views. Through a series of practical and project exercises, analyzes the various factors governing the construction and rigging of two- and three-dimensional scenery, linear-motion, rotary-motion, and elevating systems. Emphasizes theatrical problem solving with regard to safety, dependability, and economy. Lab fee. *Prereq.* DRA 1209.

DRA 1430 Lighting Design 2 4 QH

Offers an intensive study of lighting design theory and practice. Expects students to design numerous lighting plots, sections, instrument schedules, and design concepts for various types of productions and spaces. Investigates and discusses current professional techniques and practices. *Prereq.* DRA 1226.

DRA 1500 Playwriting 2 4 QH

Continues DRA 1140. *Prereq.* DRA 1140.

DRA 1505 Continental Drama 4 QH

Covers seminal late nineteenth- and mid-twentieth-century continental drama. Focuses on playwrights whose plays had a major impact on modern drama and theatre.

DRA 1510 Twentieth Century Theatre 4 QH

Studies the history of the post-naturalistic theatre in Europe and the United States. Explores the work and influence of such figures as Craig, Appia, Meyerhold, Brecht, Artaud, Grotowski, Beck and Molina, Schechner, and Chaiken.

**DRA 1800, DRA 1801, DRA 1802, DRA 1803 1 QH each
Practicum in Production**

Offers lab practice in technical production; can be repeated for credit (maximum four credits). *Prereq.* Departmental permission.

**DRA 1810, DRA 1811, DRA 1812, DRA 1813 4 QH each
Junior/Senior Honors Program****DRA 1820, DRA 1821, DRA 1822, 4 QH each
DRA 1823 Directed Study****DRA 1840, DRA 1841, DRA 1842, 4 QH each
DRA 1843, DRA 1844, DRA 1845, DRA 1846,
DRA 1847, DRA 1848, DRA 1849****Special Topics in Theatre/Dance Performance**

Offers opportunity for in-depth examination of a subject of particular significance to the field.

DRA 1860, DRA 1861, DRA 1862, DRA 1863, 4 QH each
DRA 1864, DRA 1865, DRA 1866,

DRA 1867 Special Topics in Theatrical Design

Offers opportunity for in-depth examination of a subject of particular significance to the field.

DRA 1890, DRA 1891, DRA 1892, DRA 1893 4 QH each
Special Topics in

Theatre History/Dramatic Criticism

Offers opportunity for in-depth examination of a subject of particular significance to the field.

INT 1100 Introduction to Art, Drama, and Music 4 QH

Offers an interdisciplinary, integrated approach to three related disciplines: art, drama, and music. Establishes basic vocabulary and analytical techniques for each discipline, emphasizing such common elements as color, line, rhythm, texture, and form. Examines representative works from various

periods in the context of the cultures that produced them; focuses on parallels and contrasts among the three disciplines' manifestations of specific trends, principles, and ideals. Supplements lectures, readings, and listening assignments with visits to art galleries and attendance at concerts and theatrical performances. (II)

INT 1110 American Musical Theatre 4 QH

Traces the development of the American musical from works such as *The Black Crook* to the present. Considers the role of musical theatre, both as entertainment and as serious art form, through an examination of script, score, dance, and design. Studies works by composers and lyricists such as Bernstein, Rodgers and Hammerstein, the Gershwins, Weill, Lerner and Loewe, and Cole Porter.

Accounting

ACC 1111 Accounting Principles 1 4 QH

This first of a series of accounting courses assumes students do not possess knowledge of the subject. Both this course and ACC 1112 are designed to help provide an understanding of accounting issues and objectives for proper interpretation and analysis of financial data. Specific topics covered in this first course are the nature, function, and environment of accounting; the basic accounting model; financial and analytical ratios; the accounting cycle; accounting for merchandising entities; and the control of cash and receivables. *Prereq. Sophomore standing.*

ACC 1112 Accounting Principles 2 4 QH

In this second of a series of courses, students are introduced to financial and managerial accounting decisions through class discussions, short exercises, and demonstration problems. Specific topics covered include control of inventory; acquisition, depreciation, and disposal of plant and equipment; paid-in capital related to sole proprietorships, partnerships, and corporations; short- and long-term debt financing; the analysis and interpretation of financial reporting; and the statement of changes in financial position. *Prereq. ACC 1111 and sophomore standing.*

ACC 1210 Introduction to Accounting for the Non-Business Major 4 QH

Specifically for non-business majors, this course is designed to help provide a fundamental knowledge of accounting to students who do not expect to become accountants but who would like the opportunity to learn to understand, interpret, and make use of accounting data. The course includes a survey of the foundations of accounting and the role it plays in the management of the profit and nonprofit sectors of the American economy. *Not open to College of Business Administration students.*

ACC 1330 Cost Accounting for Management 4 QH

Examines cost accounting from a managerial viewpoint. Stresses the impact of quantitative and behavioral aspects on budgets and cost control is stressed. Designed specifically for management majors. *Prereq. ACC 1112 and middler standing.*

ACC 1331 Intermediate Accounting 1 4 QH

The principal foundation course for accountants begins with a comprehensive review of basic accounting principles, operations, and financial statements. Development of accounting theory is stressed in the analysis of alternative treatments and procedures. Specific areas receiving intensive treatment are cash, accounts receivable, inventories, and current liabilities. *Prereq. ACC 1112 or equiv. and middler standing.*

ACC 1332 Intermediate Accounting 2 4 QH

This course is a continuation of the study of accounting principles, concepts, and procedures introduced in ACC 1331. Specific topics emphasized are long-term assets, depreciation, stockholders equity, and EPS. *Prereq. ACC 1331 and middler standing.*

ACC 1339 Cost Accounting 1 4 QH

Examines cost determination and use. Special consideration given to manufacturing concerns. Specifically covers cost behavior, relevant costs, performance evaluation, budgets, and standard costs. *Prereq. ACC 1112 and middler standing.*

ACC 1340 Cost Accounting 2 4 QH

Continuation of ACC 1339. Focuses on the use of cost data in decision making, budget planning, and the control process. *Prereq. ACC 1339.*

ACC 1343 Intermediate Accounting 3 4 QH

Completion of the study of basic accounting concepts and special areas of concern to modern accounting practice. Studies leases, pensions,

accounting changes, income tax accounting, changes in financial position, price-level and current-value accounting. *Prereq.* ACC 1332.

ACC 1345 Accounting Systems 4 QH

Examines the process of designing financial and managerial accounting systems. Uses a conceptual approach and considers the appropriate use of computer technology in designing new systems. Assumes an understanding of accounting processes in both financial and managerial areas. *Prereq.* *Middler standing.*

ACC 1347 Auditing 4 QH

Examines audit concepts, standards, and procedures, including the auditor's legal and ethical responsibilities, for students who plan to enter the public accounting profession. Emphasizes concepts rather than procedures. Specifically covers auditing standards, auditor's reports, internal control, statistical sampling, electronic data processing (EDP), and legal liability. *Prereq.* ACC 1343.

ACC 1351 Federal Income Taxes 1 4 QH

Emphasizes basic understanding of the federal income tax structure relating to individuals rather than corporations. Requires completion of several research cases directed at solving various tax problems. Through case studies, introduces the current Internal Revenue Code, income tax regulations, and cumulative bulletins. Discusses tax-court cases and various private company publications. *Prereq.* ACC 1343.

ACC 1505 Internal Auditing 4 QH

Helps students understand how the internal auditor undertakes a review and appraisal of operations. Focuses on the internal audit environment, preparation of long-range programs, performance of preliminary surveys, flowcharting, development of audit programs, sampling, audit techniques, and reporting. Case-study oriented. *Prereq.* *Middler standing.*

ACC 1512 Federal Income Taxes 2 4 QH

This course is a continuation of ACC 1511. Topics include taxpayers other than individuals and the treatment of property transfers that are subject to federal, gift, estate, and trust taxes. Tax research is an important element of this course. A major emphasis is given to tax planning considerations, especially to gift and death tax consequences. *Prereq.* ACC 1511.

ACC 1521 Advanced Accounting Problems 4 QH

This course is an in-depth analysis of various accounting topics for the student planning a career as a professional accountant. Topics covered are government and not-for-profit accounting; partnerships; installment sales; consignments; segment and interim reporting; foreign currency accounting; troubled-debt restructurings; and liquidations, estates, and trusts. *Prereq.* ACC 1343.

ACC 1522 Advanced Accounting for Business Combinations 4 QH

This course is a comprehensive analysis of the accounting theory and practice associated with

corporate acquisitions and combinations. Topics include methods of consolidation-elimination of profits on intercompany transactions, purchase versus pooling of interests, and accounting for good will. The course is intended for the serious student preparing for a career as a professional accountant. *Prereq.* ACC 1343 or permission of instructor.

ACC 1526 Management Accounting 4 QH

Examines the role of the management accountant. Studies relation between financial and managerial accounting, design and use of accounting and control systems, measurement techniques and uses, the role of behavior in accounting, performance evaluation, and other topics of current interest. *Prereq.* ACC 1349.

ACC 1531 Contemporary Accounting Problems 4 QH

Survey some of the important problem areas currently facing the accounting profession. Discusses asset valuation, price-level adjusted statements, environmental considerations, income measurement, and governmental intervention. *Prereq.* ACC 1332 and *middler standing.*

ACC 1535 Computers in Accounting and Auditing 4 QH

Examines the use of computers in accounting and auditing. Covers systems design and applications in accounting, internal control of computer-based systems, computer audit and control guidelines, and EDP audit tools and techniques. *Prereq.* ACC 1501 or ACC 1505.

ACC 1548 Accounting Theory and Practice 4 QH

Examines the theory, practice, and several controversial areas in corporate financial reporting; the pronouncements and research studies of the authoritative institutions of the profession relating to the practice of accounting; and the textual and periodical literature on accounting theory. *Prereq.* ACC 1343.

ACC 1549 Accounting Planning and Control 4 QH

Examines the role of management planning and control systems and the problems inherent in design and use. Defines the process of identifying factors in the design of those systems. *Prereq.* ACC 1339.

ACC 1591 Independent Study 1 QH

This course is for the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

ACC 1592 Independent Study 2 QH

Same as ACC 1591.

| | |
|---|-------------|
| ACC 1593 Independent Study | 3 QH |
| Same as ACC 1591. | |
| ACC 1594, ACC 1595, ACC 1596, ACC 1597 Independent Study | 4 QH |
| Same as ACC 1591. | |
| ACC 1711 Honors: Accounting Principles 1 | 4 QH |
| See course description for ACC 1111. | |

| | |
|---|--------------|
| ACC 1712 Honors: Accounting Principles 2 | 4 QH |
| See course description for ACC 1112. | |
| ACC 1891 Honors Thesis in Progress | 0 QH |
| ACC 1892 Honors Thesis | 8 QH |
| ACC 1893 Honors Thesis in Progress | 0 QH |
| ACC 1894 Honors Thesis | 12 QH |

Entrepreneurship

ENT 1330 Management of Smaller Enterprises **4 QH**
Focuses on the strategies and operating problems of smaller, already established business enterprises. Designed for individuals who are considering entrepreneurial careers or careers in management, finance, or marketing within the smaller-company environment. Explores the characteristics and urgencies of problems that smaller companies are likely to encounter at different stages in their evolving life cycle, from the postnatal period to the more mature stage. *Prereq.* Middler standing.

ENT 1344 Opportunity Analysis and Venture Capital **4 QH**
Focuses on the essential tasks performed prior to establishing a new venture, including finding a suitable business opportunity or developing an idea for a product or service; analyzing the feasibility of the opportunity or idea; developing a business plan; structuring the venture team; seeking sources of seed capital; and forming a venture action plan for beginning operations.

ENT 1352 New Venture Creation: A Career Choice **4 QH**
Assists students interested in small business in answering a number of important questions through a systematic analysis of their own potentials for entrepreneurial careers: What is involved in starting my own business? What is my own entrepreneurial orientation and commitment? What managerial and behavioral skills do I need for achievement? How can I plan for my personal and entrepreneurial goals? Presents case discussions, self-assessment, goal-setting exercises, guest speakers, and a student-selected project are used. *Prereq.* Senior standing.

ENT 1358 Small Business Institute Project **8 QH**
The Small Business Institute Project was brought into existence with the cooperation of the Small Business Administration (SBA) and some of its client companies in Greater Boston. A student team is expected to interact with a company, helping management to analyze opportunities and problems facing the business, and to develop practical recommendations for the company's decision makers. Students are expected to allocate approximately one day per week to the project, including on-site work

with the company owner-managers with whom they have been paired and to participate in related research, report preparation, and presentation of results. This real-world experience is blended with occasional class meetings and frequent team meetings with a faculty member to discuss the field work and to explore alternatives. Interim progress reports and a final report are presented to the client company, SBA, and the class. *Prereq.* Junior standing; one entrepreneurship course or permission of instructor.

ENT 1591 Independent Study **1 QH**
This course is for the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

ENT 1592 Independent Study **2 QH**
Same as ENT 1591.

ENT 1593 Independent Study **3 QH**
Same as ENT 1591.

ENT 1594, ENT 1595, ENT 1596, ENT 1597 Independent Study **4 QH**
Same as ENT 1591.

ENT 1598 Independent Study **8 QH**
Same as ENT 1591.

ENT 1891 Honors Thesis in Progress **0 QH**

ENT 1892 Honors Thesis **8 QH**

ENT 1893 Honors Thesis in Progress **0 QH**

ENT 1894 Honors Thesis **12 QH**

Finance and Insurance

FIN 1201 Personal Finance

4 QH

Focuses on management of the total personal estate: budgeting, savings, insurance, investments, borrowing, taxes, Social Security, pensions, annuities, securities markets, mutual funds, and their integration. *Not open to College of Business Administration students.*

FIN 1333 Financial Institutions and Markets

4 QH

Explores the financial environment faced by a firm as well as the financial institutions serving the economy. Discusses the forces that determine the changes in money and capital markets and explores the implications of changing financial environment for the management of funds in a firm and/or financial institution. *Prereq. ACC 1112 and middler standing.*

FIN 1335 Managerial Finance

4 QH

The objective of the course is to provide students the opportunity to gain knowledge of the advanced tools and concepts used in the management of funds. Topics include inventory and credit policies, risk, capital budgeting, financial structure, cost of capital, dividend policy, and valuation of a firm. Overall financial strategy and timing of its implementation are also examined. Specialized topics — mergers and acquisitions, financial failure, and financial policy for multinational firms — may be considered in the course. *Prereq. FIN 1438 and middler standing.*

FIN 1346 Investment Management

4 QH

Presents a broad overview of the concepts, practices, and procedures of investment management. Covers basic security types, security market operations, security analysis (both fundamental and technical), and an introduction to portfolio management. *Prereq. FIN 1438 and FIN 1333.*

FIN 1438 Introduction to Finance

4 QH

The objective of this course is to acquaint students with basic processes, principles, tools, and concepts of finance. Topics include financial analysis, financial forecasting, profit planning, budgeting, working capital management, and capital budgeting. The basics of financial markets, institutions, and sources of supply of different types of funds available to a firm are also covered. *Prereq. ACC 1112, MSC 1201, and middler standing.*

FIN 1503 Taxes and Financial Decisions

4 QH

In this course, the case method is used to discuss a number of financial decisions that are greatly influenced by tax considerations, the most important of which are concerned with capital structure, dividend policy, acquisition terms, investment policies and liquidations. The federal income tax receives primary consideration, but state and foreign taxes are also discussed. *Prereq. FIN 1438 and middler standing.*

FIN 1520 Speculative Markets

4 QH

The purpose of this overview course is to familiarize the student with all aspects of speculative markets, including options, futures, and options on futures. *Prereq. FIN 1346.*

FIN 1522 Option Markets

4 QH

While puts and calls have been traded for many years, a market for listed options appeared only in 1973. Trading options on exchanges made such activity much easier and opened many more opportunities for both speculation and the protection of security positions. The purpose of this seminar is to explain the basic mechanics of this market, the characteristics of puts and calls, the techniques that may be applied, and current developments in the field. Students will be required to do individual research related to current methodology and concepts. Some knowledge of money and capital markets, as well as corporate finance, is necessary for those taking the course. *Prereq. FIN 1520.*

FIN 1525 Financial Futures

4 QH

This is a seminar in financial futures markets centered in the area of interest-rate and stock-index futures. The course covers the methods of trading, margins, hedging, spreading futures contracts in treasury bills, commercial paper, treasury bonds, treasury notes, GNMA's, and other topics. Students prepare a seminar report on some aspect of the futures market. *Prereq. FIN 1520.*

FIN 1526 Securities Markets

4 QH

Analyzes the operation of the securities market. Provides students the opportunity to examine in detail the operation and function of investment bankers, broker-dealers, and securities exchanges. Thorough studies the mechanics of cash and margin accounts, trading options, and regulations affecting securities markets. *Prereq. FIN 1438 and middler standing.*

FIN 1530 Working Capital Management

4 QH

Examines strategies and analytical approaches to managing current assets and current liabilities. Explores corporate cash management under changing money market conditions. Discusses the use of interest rate futures and working capital management in a multinational context. *Prereq. FIN 1438.*

FIN 1531 Capital Investment Decision Analysis

4 QH

Analyzes capital budgeting techniques and portfolio considerations, including risk analysis, capital structure and valuation, and other long-term corporate finance topics. *Prereq. FIN 1438.*

FIN 1538 Financial Ethics

4 QH

Investigates and helps develop a systematic understanding of ethical dilemmas of financial business decision making. Examines the influence of business

cultures on personal behavior, combining wisdom of the past with current ethical thinking and each individual's standards. *Prereq.* FIN 1438.

FIN 1540 Management of Financial Institutions 4 QH

Studies the decision-making problems faced by financial institutions such as commercial banks, savings and investment institutions, and finance companies when viewed as competitive, profit-seeking business entities. Covers such topics as the nature and scope of the capital markets confronting institutions, specialized problems regarding the sources and uses of funds of financial institutions, the nature of competition, the regulation of financial institutions, and strategic policy planning of financial institutions. *Prereq.* FIN 1438 and FIN 1333.

FIN 1543 Modern Portfolio Management 4 QH

Analyzes the methods of selection, revision, and performance measurement of asset portfolios. Exposes the students to the current methods of building an asset portfolio. Presents and evaluates the concept of the efficient frontier of assets in the risk-return space. Includes a simulated equity fund-management project, in which students select equity securities and then prepare and present annual reports evaluating their portfolios' construction and performance. *Prereq.* FIN 1346.

FIN 1544 Bank Management 4 QH

Examines the financial management of commercial banks and thrift institutions. Analyzes the problems of liquidity and investment management, loan portfolio and capital management, and pricing problems associated with various sources and uses of funds in the context of changing economic and regulatory environment for these institutions. Presents lectures, discussions, and cases. *Prereq.* FIN 1438 and FIN 1333.

FIN 1545 Investment Banking 4 QH

Focuses on the managerial functions of investment banking firms. Examines individual investors and institutions in the money and capital markets from the viewpoint of investment banking firms. Familiarizes students with the operating and cash flow characteristics of institutional and individual clients. *Prereq.* FIN 1438.

FIN 1549 Principles of Real Estate 4 QH

Surveys the field of real estate, including principles of real estate law, valuation, brokerage, finance, land use, and negotiations. Gives the student the opportunity to become a better decision maker and to prepare for future studies in real estate. *Prereq.* FIN 1438.

FIN 1550 Real Estate Finance: Analysis and Investment 4 QH

Presents real estate financing techniques, sources of funds, and investment property analyses. Examines the legal and financial aspects of such techniques as mortgage liens, leaseholds, contracts for deed, and sale-leasebacks, as well as the primary and secondary mortgage markets. Surveys methods of valuing income properties. *Prereq.* FIN 1549.

FIN 1562 Employee Benefits Management 4 QH

Covers the design, implementation, and financing of corporate employee benefit plans. Presents a comprehensive analysis of qualified and non-qualified benefit and executive compensation plans. Emphasizes the proper management, design, and financing of these plans to achieve corporate goals at minimum feasible cost. Studies alternative methods of financing benefit and executive compensation plans. Includes recent developments in Social Security, benefits, and tax legislation. *Prereq.* FIN 1438 and *middler standing*.

FIN 1566 Risk Management and Insurance 4 QH

Emphasizes the functional area of corporate risk management. Covers such areas as organizing and controlling the risk management function; identifying, measuring, controlling, and financing risk; selecting the best method of risk treatment; and implementing and monitoring risk management. Topics of exposure analysis include property, liability (public, employer, products, officers and directors, and professionals), income, and extraordinary expense losses. Covers treatment methods such as self-insurance, off-shore captive, retention groups, and commercial insurance. Includes recent developments such as tort reform integration of risk management with modern financial theory, as well as implications and analysis of recent tax reforms. *Prereq.* FIN 1438 and *middler standing*.

FIN 1580 Personal Financial Management 4 QH

In this course, emphasis is placed on the development of personal financial management expertise, based on an integrated plan for personal choices in which alternative courses of action are judged by their contribution to the attainment of the decision maker's particular set of economic objectives. The overall personal economic plan is the consistent focus of the course and unites such diverse topics as inflation and investment selection, insurance, short- and long-run hedges against the purchasing power risk, and purchasing assets. The course is decision oriented, and students are exposed to alternative courses of action and lead toward a rational solution through development of techniques of estimating the success probabilities of alternative methods. *Prereq.* FIN 1438 and *middler standing*.

FIN 1582 Personal Insurance Planning 4 QH

Insurance planning is an important part of financial planning. In this course, focus is on the informed decisions necessary to establish a comprehensive, rational plan of personal insurance. Class discussion, lectures, and readings examine the various kinds of personal insurance and how to create an insurance package for clients with different insurance needs. *Prereq.* FIN 1438.

FIN 1591 Independent Study 1 QH

This course is for the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every

proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

FIN 1592 Independent Study 2 QH
Same as FIN 1591.

FIN 1593 Independent Study 3 QH
Same as FIN 1591.

FIN 1594, FIN 1595, FIN 1596, FIN 1597 Independent Study 4 QH
Same as FIN 1591.

FIN 1738 Introduction to Finance (Honors) 4 QH
Acquaints students with basic processes, principles, tools, and concepts of finance. Topics include financial analysis, financial forecasting, profit planning, budgeting, working capital management, and capital budgeting. Covers the basics of financial markets, institutions, and sources of supply of different types of funds available to a firm. *Prereq.* ACC 1112, MSC 1201, and middler standing.

FIN 1759 International Financial Markets 4 QH
Introduces international financial markets, including balance of payments, history of the international monetary system, exchange-rate determination, foreign-exchange-exposure hedging strategies, and international capital markets. Emphasizes how international financial markets work and how corporations must adapt their decision-making to the international environment. *Prereq.* FIN 1438.

FIN 1760 International Financial Management 4 QH
Examines how the financial strategies and policies of multinational corporations differ from domestic corporations and how financial management is utilized in an international setting to achieve corporate goals. Specific topics include cost of capital, capital budgeting, capitalization policies, and management techniques for dealing with exchange-rate exposure and working-capital issues. Knowledge of exchange rates is assumed. *Prereq.* FIN 1759.

FIN 1770 Small-Business Finance 4 QH
In this course, the basic processes, principles, tools, and concepts of finance are utilized within the parameters of a small business to develop a complete financial plan that projects the future circular flow of funds by analyzing and then integrating the impact of both investment decisions (use of funds) and financial decisions (source of funds). *Prereq.* FIN 1438.

FIN 1804 Issues in Corporate Control (Honors) 4 QH
Examines the nature of conflicts between managers and shareholders over control of a corporation. Explores the effects of corporate control on financial performance of a firm and on decisions within the firm. Covers topics such as "managerialism," agency theory, problems in defining control of a corporation,

and stock-price theory. Analyzes issues of dissident shareholder actions, such as proxy fights and hostile takeover attempts. *Prereq.* Honors participation or permission of instructor.

FIN 1806 Investment Arbitrage (Honors) 4 QH
The purpose of this course is to provide the student with an opportunity to develop the prerequisite skills necessary for conducting successful investment arbitrage. Incorporating the recent insights into arbitrage pricing theory, students conduct an extensive computerized analysis of the arbitrage opportunities in the financial equity, debt, option, and futures markets. Examination of this emerging and popular investment approach is augmented with the appearances of guest arbitrage practitioners. *Prereq.* Honors participation or permission of instructor.

FIN 1808 The Chief Financial Officer (Honors) 4 QH
Develops, primarily through student interaction with financial executives, an understanding of the changing role of the CFO and to address significant topics in financial management. Topics include financial ethics, hostile takeovers, financial public relations, legal aspects of financial management, financial strategies at high-technology and public utility companies. Students develop research papers based on readings, case studies, and discussions with CFOs who participate in class sessions. *Prereq.* Honors participation or permission of instructor; junior standing.

FIN 1809 Restructuring the Modern Corporation (Honors) 4 QH
Investigates motivations, objectives, and results of different types of corporate restructurings. Covers stock buybacks, leverage buyouts (LBOs), spinoffs, mergers, and capital structure changes (recapitalizations). Focuses on development of a historical perspective in regard to restructuring; a theoretical background, concentrating on stock price theory, dividends, mergers, and hostile takeovers; and a working knowledge of techniques and financial statement consequences of restructuring. Utilizes case discussions. Knowledge of spreadsheet software mandatory. *Prereq.* Honors participation or permission of instructor.

FIN 1810 Contemporary Issues in Corporate Finance (Honors) 4 QH
Examines recent developments in financial markets and the corporate environment. Issues include security offerings, signaling, and the implications for financial structure; option pricing and financial policy; and the disciplining effects of the market for corporate control and the wealth consequences to participating parties. *Prereq.* Honors participation or permission of instructor.

FIN 1891 Honors Thesis in Progress 0 QH

FIN 1892 Honors Thesis 8 QH

FIN 1893 Honors Thesis in Progress 0 QH

FIN 1894 Honors Thesis 12 QH

Human Resources Management

HRM 1332 Introduction to Human Resources Management

4 QH

Helps students develop understanding of contemporary issues in human resource management. Examines problems posed by changing work patterns, labor force characteristics, union activities, and government policies. Discusses and evaluates organizational experiments such as worker participation, job enlargement, and group incentives from a managerial perspective. *Prereq.* HRM 1432 or HRM 1433; *middler standing.*

HRM 1345 Contemporary Labor Issues

4 QH

Studies current issues dealing with labor in its broadest sense. Discusses and evaluates labor unions and manpower institutions as well as the emerging development and training problems motivated by unemployment, poverty, and changing work patterns. Reviews recent legislation dealing with the employment relationship. *Prereq.* HRM 1431 or HRM 1433.

HRM 1348 Reward Systems: Wage, Salary, and Benefits Administration

4 QH

Examines one of the major functions of personnel administration — compensation management — and its part in the overall personnel programs of the organization. Develops through simulation exercises, group projects, lectures, and cases an analysis of reward systems as supportive mechanisms of management and the formulation of compensation policy and implementation of compensation systems. *Prereq.* HRM 1431 or HRM 1433.

HRM 1349 Selection and Assessment of Employees

4 QH

Examines three influences of employee selection and testing: the legal aspect of selection, where the greatest uncertainty is found; the influence of industrial psychology on selection and decision-making techniques; and the area of personnel practices itself, that is, the methods employers find effective in coping with legal requirements. Covers basic issues and procedures such as EEO, decision strategies, and the utility and evaluation of selection and appraisal systems. *Prereq.* HRM 1432 or HRM 1433.

HRM 1431 Complex Organizations

4 QH

Examines the structure and dynamics of the complex organization. Focuses on the design of the organization and its basic subsystems (reward, control, selection, development). Explores how organizational structures help shape human behavior. Emphasizes understanding the interrelations among organizational structures, tasks, and individual characteristics within the context of a changing environment. *Prereq.* *Middler standing.*

HRM 1432 Organizational Behavior

4 QH

Explores the effects of individual, interpersonal, group, and leadership factors on human behavior. Also explores managerial applications of behavioral and social science concepts, including job design, job satisfaction, performance appraisal, supervision,

career dynamics, and organizational change. Emphasizes helping the student develop skills in dealing with the human side of enterprise. *Prereq.* *Middler standing.*

HRM 1433 Organizational Behavior and Design

4 QH

Covers the material from HRM 1431 and HRM 1432. The structure and dynamics of the complex organization are examined, focusing on the design of the organization and its basic subsystems. The effects of individual, interpersonal, group, and leadership factors on human behavior are also examined. Students have the opportunity to explore how organizational structures help shape human behavior and to develop skills in dealing with the human side of enterprise. *Prereq.* *Middler standing.*

HRM 1504 Strategies of Organizational Changes

4 QH

Focus on three basic areas: organizations as stable systems that naturally resist both planned and unplanned change; organizations as dynamic systems that continuously respond to both internal and external pressures for change; and strategies and techniques for designing, implementing, and managing change. Discusses the role of the change agent in this context. *Prereq.* HRM 1431 or HRM 1433.

HRM 1508 Participative Management

4 QH

Participative management refers to a range of techniques that may enhance employee involvement in decision making. These methods take a variety of forms and are used in many different settings with mixed results. This course studies the motivational basis for participative programs, describes the forms and techniques available, and examines criteria for evaluating effectiveness. This course also considers internal and external organizational factors that may affect overall success of participation and discusses cultural and social aspects of participative management in an international business environment. *Prereq.* HRM 1431 and HRM 1432 or HRM 1433.

HRM 1512 Motivation and Control

4 QH

Extensively analyzes various theories of motivation, including Herzberg's two-factor theory, expectancy theory, learning theory, need theory (McClelland), and competence motivation. Also considers the behavioral implications of various organizational systems of measuring and controlling operations. *Prereq.* HRM 1431 or HRM 1433.

HRM 1519 Leadership

4 QH

In this course, the leadership function in a variety of organizational settings is studied. Using a contingency approach, students explore a range of possible leadership behaviors, relating the appropriateness of a particular style to a number of situational factors. Readings provide an opportunity to explore several contingency theories of leadership; cases allow for the application of these models; and videotaped role

playing and self-assessment techniques permit students to evaluate their own leadership style. *Prereq.* HRM 1431 or HRM 1433.

HRM 1539 Managing Careers

4 QH

Surveys the tools for both self-assessment (investigating one's skills, abilities, needs, values, and interests) and career exploration (determining the nature of and requirements for entering and succeeding in various career fields). Helps students develop an individualized plan of action that summarizes a wide variety of data indicating an individual's present status and career goals and the means by which to bridge the gap. *Prereq.* HRM 1431 or HRM 1433.

HRM 1581 Managerial Skills Seminar

4 QH

Studies and develops specific behavioral and interpersonal skills critical for managerial success, particularly those most vital early in management careers, in a seminar/workshop format. Uses introspective and experiential exercises and role plays extensively and discusses specific work assignments. *Prereq.* HRM 1432 or HRM 1433 and satisfaction of middler-year writing requirement.

HRM 1583 Seminar in Collective Bargaining

4 QH

Focus is on the organization, negotiation, and administration of collective-bargaining relations between management and unions in different industries, services, and levels of government. Simulations of actual bargaining and an arbitration exercise are also a part of the course. *Prereq.* HRM 1431 or HRM 1433.

HRM 1585 Managing Human Resources:

4 QH

The Legal Environment

Studies the recent legal developments affecting the management of human resources. Examines recent state and federal laws that will influence managerial policies and practices in areas such as employment testing, hiring and promotion, controlling unemployment compensation and Worker's Compensation claims, and responding to OSHA and ERISA regulations. *Prereq.* Middler standing.

HRM 1591 Independent Study

1 QH

This course is for the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every

proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

HRM 1592 Independent Study

2 QH

Same as HRM 1591.

HRM 1593 Independent Study

3 QH

Same as HRM 1591.

HRM 1594, HRM 1595, HRM 1596, HRM 1597 Independent Study

4 QH

Same as HRM 1591.

HRM 1760 International Labor Relations Systems

4 QH

Analyzes labor relations systems of selected countries in comparison with that of the United States. Also studies the political, cultural, and economic forces that shaped these systems. Gives special attention to such international institutions as multinational companies and the EEC. Cases, readings, and projects assigned. *Prereq.* HRM 1431 or HRM 1433.

HRM 1762 Managing People in International Settings

4 QH

Covers basic issues in human resources management relevant to managing in international and cross-cultural environments. Examines selection and training of personnel for work in multicultural environments, managing the international employee in the United States and abroad, cross-cultural communication, international environments, special issues of concern to small business, and change in multinational companies. *Prereq.* Junior standing.

HRM 1891 Honors Thesis in Progress

0 QH

HRM 1892 Honors Thesis

8 QH

HRM 1893 Honors Thesis in Progress

0 QH

HRM 1894 Honors Thesis

12 QH

International Business Administration

INB 1338 Introduction to International Business

4 QH

Focus is on the cultural, economic, and political aspects of domestic and foreign environments and their effect on the international operations of business firms. Topics include the principles, patterns, and potential of international trade and investments; the development of management strategies for international businesses; and the organization and management of the firm's international operations. *Prereq.* Middler standing.

INB 1352 Seminar in International Business

4 QH

The concepts and skills acquired in other international and domestic courses are applied to the solution of managerial problems. Focus is on the task of solving significant managerial problems in international and foreign cultural contexts. Students' reports form a major part of this course and are expected to concentrate either on a functional business area related to international operations or on analyses of market opportunities and methods

of entry in a foreign environment. Other instructional vehicles include case analyses and discussions of current issues. *Prereq.* INB 1338 and senior standing.

INB 1731 Cultural Aspects of International Business 4 QH
Covers, from a managerial perspective, issues that arise when a firm moves from its home country to a host country that may have a different national culture. Focuses on United States-based firms that operate abroad. Also considers what happens to other nation's firms operating in the United States and in third-country environments. Analyzes how "corporate culture" evolves in the context of national

culture and the impact on managers. *Prereq.* Middler standing.

INB 1802 Regional Topics in International Management (Honors) 4 QH

Focuses in depth on management in three very different, rapidly changing managerial environments: Europe in 1992, the less developed countries of Asia and Africa, and Eastern Europe. Uses case analysis, audio-visual material, and guest speakers to explore issues that managers face and especially how they operate in an environment of uncertainty and turbulence. *Prereq.* Honors participation or permission of instructor.

Management

MGT 1115 Introduction to Business 4 QH
Introduces the basic functions of management, team-taught by faculty from all areas of the College of Business Administration. Examines academic choices and career opportunities in business.

MGT 1345 Legal Aspects of Business 4 QH
Examines the legal aspects of business transactions and business relationships involving contracts and sale of goods under the Uniform Commercial Code, as well as product liability and agency law.

MGT 1446 Managing Social Issues 4 QH
Analyzes environmental influences — economic, legal, technical, social, cultural, and ethical — affecting the corporation. Focuses on managerial decision making that will make the most effective use of the opportunities created by these external factors. *Prereq.* HRM 1431 or HRM 1433; junior standing.

MGT 1450 Business Policy 4 QH
Focuses on corporate strategy and its elements, including an analysis of the company, its resources, opportunities, environment, and decision makers. Emphasizes decision making and implementation of strategy while operating a company in the context of a business simulation. *Prereq.* Senior standing.

MGT 1571 The Law of Business Organizations and Commercial Paper 4 QH

Introduces the legal aspects of the typical forms of business organizations, partnerships, corporations, and the rights, responsibilities, and liabilities involved. Also covers the law governing commercial paper under the Uniform Commercial Code, and the Bankruptcy Reform Act of 1978. *Prereq.* MGT 1345 and middler standing.

MGT 1572 Law of Wills, Trusts, and Estates 4 QH
Examines requirements of valid will, claims of and against estates; the administration of estates, both formal and informal; essential elements for the creation of a trust; kinds of trusts, including inter vivos and testamentary trusts; the rights, responsibilities, and liabilities of trustees; and the rights of beneficiaries. *Prereq.* Middler standing.

MGT 1573 Bulk Sales and Bankruptcy 4 QH
Examines bulk transfers, with detailed study of the Uniform Commercial Code, Article 6; the need of the transferor to give to the transferee a sworn list of all his creditors; the giving of notice to the listed creditors; the contents of the notice, what creditors are protected; and the legal consequences of failure to comply with the Code. Also deals with both voluntary and involuntary bankrupts; the appointment and duties of the trustee; provable and dischargeable debts; priority of debts; discharge and acts that bar a discharge. *Prereq.* Middler standing.

MGT 1574 Law in Society 4 QH
Provides students the opportunity to acquire a broad view of their legal rights, obligations, and responsibilities in their relations with others and with the state. Includes study of torts, such as assault and battery, trespass, negligence, slander, libel, and deceit, and crimes such as homicide, assault and battery, robbery, arson, larceny, and burglary. *Prereq.* Middler standing.

MGT 1575 Negotiations 4 QH
Focuses on broadening the students' understanding of the negotiations process, emphasizing the strategies and techniques that might be employed in that process. Includes familiarization with related literature, student role playing, and interaction with professionals involved in private- and public-sector negotiations.

MGT 1591 Independent Study 1 QH
This course is for a student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about

the Independent Studies Program can be obtained from area coordinators.

MGT 1592 Independent Study 2 QH
Same as MGT 1591.

MGT 1593 Independent Study 3 QH
Same as MGT 1591.

MGT 1594, MGT 1595, MGT 1596, MGT 1597 Independent Study 4 QH
Same as MGT 1591.

MGT 1720 Labor Law 4 QH
Helps acquaint the student with the many constitutional and legal problems involved in labor organizing, industrial relations, labor negotiations, labor contract enforcement, and dispute resolution. Examines cases for the legal principles underlying the common law, state and federal laws, and the constitutional questions of power and authority. Also considers the Sherman Act, Clayton Act, Norris-LaGuardia Act, and Labor Management Relations Act. *Prereq. Middler standing.*

MGT 1808 Honors: Seminar on the Management of Innovation 4 QH
The management of technological innovation is of critical importance to American companies as they face increasing worldwide competition. Knowledge in the area is advancing rapidly and incorporates work from several disciplines, including strategy, marketing, organizational behavior, and finance. This course will be run as a research seminar. Students will be responsible for identifying relevant topics in the management of innovation and completing a research study. Students can work either individually or in small groups on the research topic they define. Students will be required to submit a research proposal, a progress report at mid-quarter, and a final paper and presentation. *Prereq. Honors participation or permission of instructor.*

MGT 1819 Honors: Seminar in Research 4 QH
Focuses on the definition of research in the context of the business environment, research methodologies, and the student's attempt at research through a term project. Analyzes the formulation of concepts, hypotheses, and theories; the design of research projects; data collection; data analysis; and report writing. Involves a term project that investigates a subject of interest to the student and that is intended to serve as a prototype of honors thesis. *Prereq. MSC 1201.*

MGT 1820 Honors: Independent Study 4 QH
Offers directed study toward fulfillment of Honors Program requirements and is open only to students who have been accepted into the Honors Program. Procedures for arranging the honors independent study are the same as those for MGT 1594.

MGT 1828 Honors: Legal Environment of Business 4 QH
Examines significant legal issues confronting the corporate community through cases, readings, and videotapes. Topics include discrimination in employment, protection of workers, product and service liability, antitrust law, and the law of business organizations. Provides practical legal advice for potential managers. *Prereq. Honors participation or permission of instructor.*

MGT 1891 Honors Thesis in Progress 0 QH

MGT 1892 Honors Thesis 8 QH

MGT 1893 Honors Thesis in Progress 0 QH

MGT 1894 Honors Thesis 12 QH

Marketing

MKT 1331 Marketing Management 4 QH
Provides training in marketing decision making. Uses case studies simulating actual business settings to help students develop analytical abilities and sharpen their communications skills. Covers topics that range from techniques used to analyze a market to the development of a total marketing strategy (product policy, pricing policy, promotion policy, and distribution policy). *Prereq. MKT 1435 and middler standing.*

MKT 1341 Marketing Research 4 QH
Focuses on the survey research process and the analysis of data using "canned" computer programming routines. Covers topics such as problem definition, research design, sampling techniques, questionnaire development, data collection methods, and data analysis. Students expected to work on group projects

with participating firms. Requires no previous computer experience. *Prereq. MKT 1331 and MSC 1201.*

MKT 1351 Competitive Strategy 4 QH
This course is a capstone marketing course, required of all students with a marketing concentration. The focus is on the formulation of marketing strategy at a policy level and its implementation in a dynamic environment. *Prereq. MKT 1331, MKT 1341, and senior standing.*

MKT 1435 Introduction to Marketing 4 QH
Consists of lectures, readings, and small-group discussions on the role of marketing in contemporary society, in the business enterprises, and in the non-profit organization. Considers the planning, operation, and evaluation of marketing and promotional

efforts necessary to the effective marketing of consumer and industrial products and services in both profit and nonprofit organizations. *Prereq.* *Middler standing.*

MKT 1501 Introduction to Retailing

4 QH

Explores the range of retail firms that make up the retailing industry, from large mass merchandisers to small specialty outlets. Examines the functions, practices, and organizations of various store types. Considers such topics as current issues, career opportunities, the environment of retailing and retailing's role in the economy. *Prereq.* *Middler standing.*

MKT 1503 Retail Merchandising and Control

4 QH

Examines the concepts and techniques of store operations and merchandise management. Considers topics such as calculating and planning markups and markdowns, pricing, inventory control, stock turn, open-to-buy, profitability analysis, and expense control. *Prereq.* *MKT 1435 or permission of instructor.*

MKT 1504 Fashion Retailing

4 QH

Provides an understanding and appreciation of the dynamics and multidimensional nature of the fashion business. Uses assigned readings and projects to examine how the fashion industry functions and how fashion is produced and merchandised. Simulates functions of the retail buyer. *Prereq.* *MKT 1435 or permission of instructor.*

MKT 1507 Retail Strategies and Problems

4 QH

Considers strategic and policy decisions of major retail enterprises engaged in food, apparel, and general merchandise distribution. Analyzes the evolution of retail institutions along with the characteristics of and prospects for new store types. *Prereq.* *MKT 1435; junior or senior standing or permission of instructor.*

MKT 1512 Marketing for Nonprofit Organizations

4 QH

Examines the unique characteristics of marketing in public and nonprofit enterprises. Aims to expand the scope of marketing management concepts beyond the traditional setting of business. Pays particular attention to the basic decision-making differences between public and private firms. Involves case analysis, assigned readings, and a group project. *Prereq.* *MKT 1331 and middler standing.*

MKT 1513 Direct Marketing

4 QH

Direct marketers use direct response advertising to generate immediate, measurable responses—either direct sales or requests for more information—from their prospects and customers. Focus is on starting and managing mail-order catalog businesses; conducting consumer and business-to-business direct mail campaigns; preparing telemarketing programs; and creating newspaper, magazine, radio, and television direct-response advertising. *Prereq.* *MKT 1331 and middler standing.*

MKT 1515 Marketing in the Service Sector

4 QH

Presents a basic treatment of methods and techniques for marketing in the service sector, which includes sports, recreation, public service, banking,

insurance, and hotels. Also analyzes a number of descriptive studies covering the application of such marketing principles in key service areas. *Prereq.* *MKT 1331 and middler standing.*

MKT 1523 Advertising Management

4 QH

Focuses on the management of the advertising function in relation to a firm's overall marketing objectives. Approaches the subject from the perspective of the user of advertising (for example, the product manager and the marketing manager). Uses case studies and text material to help the student develop decision-making skills. *Prereq.* *MKT 1331 and middler standing.*

MKT 1531 Sales Management

4 QH

Helps the student develop decision-making skills necessary for both building and maintaining an effective sales organization. Uses cases and readings to examine the strategic and operating problems of the sales manager. Includes such major topic areas as the selling function, sales management at the field level, and the sales executive. *Prereq.* *MKT 1331 and middler standing.*

MKT 1536 Brand Management

4 QH

Focuses on the management and development of brand strategies as well as the management of the product mix in the multi-product firm. Includes such topics as evaluating and planning new consumer product introductions, identifying and screening new product opportunities, evaluating market performance, segmenting the product/market, and managing the product line. *Prereq.* *MKT 1331 and middler standing.*

MKT 1540 Marketing Channels

4 QH

Studies marketing structures and institutions: their evolution, functions, interrelations, and the management of their role in the marketing process. *Prereq.* *MKT 1435 or permission of instructor; junior or senior standing.*

MKT 1542 Industrial Marketing

4 QH

Examines the marketing of products where business firms are the potential customers. Upperclass elective, open to juniors and seniors. *Prereq.* *MKT 1331 and middler standing.*

MKT 1545 New Product Development

4 QH

For most firms, coping with the problems of environmental change through modification of the product line is both vital and difficult. This seminar is concerned primarily with the examination and analysis of the problems firms face in directing and managing their new product development activities. *Prereq.* *MGT 1450.*

MKT 1547 Marketing in High-Tech Industries

4 QH

For students who already have a good background in marketing and who are interested in analyzing the special marketing problems that high-tech industries pose. Includes such topics as the use of market research when customer preferences are not yet developed and the use of marketing as a strategic variable. *Prereq.* *MKT 1331.*

MKT 1553 Foundations of Consumer Behavior 4 QH

Helps students develop an understanding of consumer attitudes and behavior processes as the basis of the design of marketing problems. Considers economic and behavioral models of consumer behavior and underlying behavioral theories and concepts. *Prereq.* MKT 1331 and middler standing.

MKT 1560 Marketing Information and Decision 4 QH

Surveys state-of-the-art marketing information systems and computer-based business aids. Explores their applicability to various marketing management situations. Provides hands-on experience through the use of actual business case studies. *Prereq.* MKT 1331, junior or senior standing, or permission of instructor.

MKT 1573 Workshop in Negotiations 4 QH

Helps students improve their understanding of the negotiations process and their ability to plan and conduct negotiations effectively. Involves readings, lectures, and discussions, as well as numerous case discussions and live and videotaped role-play negotiation exercises. *Prereq.* Junior or senior standing.

MKT 1580 Quantitative Methods in Marketing 4 QH

Focuses on statistical methods and techniques commonly used in the analysis and interpretation of survey and experimental data. Uses "canned" computer programs to illustrate the applicability of the methods discussed. Requires no previous computer experience. *Prereq.* MSC 1201.

MKT 1591 Independent Study 1 QH

This course is for the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

MKT 1592 Independent Study 2 QH

Same as MKT 1591.

MKT 1593 Independent Study 3 QH

Same as MKT 1591.

MKT 1594, MKT 1595, MKT 1596, MKT 1597 4 QH**Independent Study**

Same as HRM 1591.

MKT 1735 Honors: Introduction to Marketing 4 QH

Explores the role of marketing in contemporary society, business enterprises, and nonprofit organizations through lectures, readings, and small group discussions. Considers planning, operating, and evaluating marketing and promotional efforts that are necessary to effectively market consumer and industrial products and services in both profit and nonprofit organizations. *Prereq.* Middler standing and honors participation.

MKT 1760 International Marketing 4 QH

Introduces those aspects of marketing that are unique to international business within the framework of traditional functional areas of marketing. Focuses on the environment and the modifications of marketing concepts and practices necessitated by environmental differences. Includes such topics as cultural dynamics in international markets, political and legal environmental constraints, educational and economic constraints, international marketing research, international marketing institutions, and marketing practices abroad. *Prereq.* MKT 1435 and middler standing.

MKT 1807 Honors: Analysis of Survey Data 4 QH

Focuses on the most widely used techniques for analyzing survey data and discusses some of the problems researchers face in their attempts to obtain high-quality, reliable information. Opportunities to analyze data from previously collected surveys and to prepare summary reports that succinctly summarize the major findings.

MKT 1809 Honors: The Marketing and Sales Executive 4 QH

Introduces the skills required of a senior marketing and sales executive. Focuses on the importance of sales management in implementing overall marketing strategy. Emphasizes practical theories and approaches for improving the total effectiveness of the marketing/sales function. *Prereq.* Honors participation or permission of instructor.

MKT 1891 Honors Thesis in Progress 0 QH**MKT 1892 Honors Thesis 8 QH****MKT 1893 Honors Thesis in Progress 0 QH****MKT 1894 Honors Thesis 12 QH**

Management Science

MSC 1200 Business Statistics 1 4 QH

Studies statistics, which is the methodology concerned with data collection, analysis, and interpretation. Discusses the information that is generated by statistical methods and used for analyzing decisions in the face of uncertainty. Introduces fundamental concepts and methodology of probability,

probability distribution, Bayesian revisions, estimation, and hypothesis testing. *Prereq.* MTH 1114.

MSC 1201 Business Statistics 2 4 QH

Continues topics covered in MSC 1200. Includes chi-square tests, simple and multiple regression-correlation analysis, and elementary concepts of decision theory. *Prereq.* MSC 1200.

MSC 1226 Computer-Based Information Systems 4 QH

Introduces computer-based information systems. Covers topics such as the hardware, software, and systems used to aid in the solution of modern business problems and the methods used to store, retrieve, and communicate information. Provides hands-on experience with several contemporary business software packages. Through a project, gives the student an appreciation for the problems and benefits associated with utilizing modern information technology and systems. *Prereq.* *Sophomore standing.*

MSC 1331 End User Computing 4 QH
(Formerly MSC 1562)

Investigates the capabilities of several more advanced software packages available on both main-frame and personal computers. Covers such topics as database management systems, financial modeling systems, and telecommunications. Includes a project dealing with the evaluation of hardware and software for business environments. *Prereq.* *MSC 1226 and middler standing.*

MSC 1339 Business Programming 1 4 QH
(Formerly MSC 1352)

An introduction to structured COBOL programming. Covers documentation techniques, record and file layouts, manipulation of sequential files, error detection, table-handling techniques, complex IF statements, COBOL arithmetic, manipulation of character strings, and debugging techniques. *Prereq.* *MSC 1226 and middler standing.*

MSC 1340 Business Programming 2 4 QH
(Formerly MSC 1353)

Continues MSC 1339. Covers advanced topics such as user-defined functions, parameter passing, and modular coding. Explores ways to integrate third-party library routines into computer code. Focuses on design and programming walkthrough techniques. *Prereq.* *MSC 1331, MSC 1339, and junior standing.*

MSC 1349 Systems Analysis and Design 4 QH

Covers concepts and techniques in systems analysis and design, including the systems development life cycle, prototyping, systems design techniques, the role of the systems analyst, project management, and the efficient use of available resources and technology. *Prereq.* *MSC 1339.*

MSC 1350 Database Management Systems 4 QH

Discusses the use of database management systems (DBMS) for business data processing and MIS. Covers the principles of database design, using the hierarchical, network, and relational data models. Includes other topics such as normalization, the data dictionary, query languages, forms management software, fourth-generation software environments, and distributed DBMS concepts. Provides practical experience in using a DBMS implemented on the University's computers. Explores management issues in the implementation and control of DBMS. *Prereq.* *MSC 1340 and MSC 1349.*

MSC 1351 Management Information Systems 4 QH
(Formerly MSC 1571)

Analyzes the dynamic nature of effective information systems in supporting decision making in organizations. Uses both text and cases to present a framework for developing, managing, and using the information resources of the organization. Topics include strategic planning for information systems, meeting the information needs of the various functional areas of management, office automation, the information center, decision support systems, distributed processing, security and privacy issues, artificial intelligence, expert systems, and organizational and political problems associated with managing information. *Prereq.* *MSC 1350 and senior standing.*

MSC 1433 Quantitative Models in Business 4 QH

Focuses on the construction of appropriate mathematical models (simplified representations or abstractions of reality) for managerial decision-making problems. Discusses criteria for selecting various stochastic and deterministic models. Specifically covers decision trees, decision analysis, linear programming, and simulation. *Prereq.* *MSC 1201.*

MSC 1441 Operations Management 4 QH

Considers the productive system of an enterprise whereby inputs of technology, materials, personnel, and information are transformed into useful goods and/or services. Introduces the types of problems and issues encountered by the operations manager. Discusses various models and techniques but emphasizes problem formulation and managerial implications. *Prereq.* *MSC 1201.*

MSC 1501 Purchasing and Materials Management 4 QH

Examines decisions related to the flow of materials from supplier to point of use. Emphasizes problems related to purchasing, including negotiation, value analysis, and supplier selection. Emphasizes materials management in manufacturing organizations, but also covers nonprofit and nonmanufacturing concerns. Applies latest research in field gleaned from projects sponsored by the National Association of Purchasing Management and the American Production and Inventory Control Society. *Prereq.* *MSC 1441.*

MSC 1511 Operations Planning and Control 4 QH

Focuses on the planning and control necessary for an enterprise to respond to customer demand. Specifically includes the design of the planning and control system, inventory planning and control, forecasting for operations planning, and operations scheduling. *Prereq.* *MSC 1441.*

MSC 1523 Production Management 4 QH

Continues MSC 1441. *Prereq.* *MSC 1441.*

MSC 1553 Decision Analysis 4 QH

Focuses on the analysis of decision making, with particular emphasis on realistic problems under uncertainty. Aims to help improve the student's ability to make better decisions through a careful consideration of alternative courses of action and their consequences, relevant objectives, and the element of risk. Covers the basic components of decision problems,

the concepts of risk and utility, decision trees, and value of information and multicriteria decision-making. *Prereq.* MSC 1201.

MSC 1564 High-Technology Operations Management 4 QH
High-technology industries are usually characterized by greater degrees of innovation and faster rates of obsolescence of products and capital equipment than other industries. In addition, they are supported by manufacturing operations that are at the early phases of the learning curve. In this course, the importance of these factors and the application of the tools and techniques of operations management to firms operating in a high-technology environment are discussed. It is recommended for students interested in careers in high-technology manufacturing industries, as analysts for venture capitalists, and as consultants. *Prereq.* MSC 1441.

MSC 1575 Negotiations 4 QH
Focuses on broadening the students' understanding of the negotiations process, while exploring such issues as the strategies and techniques that might be employed. Surveys related literature. Relies heavily on student role playing and interaction with professionals involved in private and public sector negotiations. *Prereq.* Middler standing.

MSC 1591 Independent Study 1 QH
This course is for the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a

supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

MSC 1592 Independent Study 2 QH
Same as MSC 1591.

MSC 1593 Independent Study 3 QH
Same as MSC 1591.

MSC 1594, MSC 1595, MSC 1596, MSC 1597 Independent Study 4 QH
Same as HRM 1591.

MSC 1700 Honors: Business Statistics 1 4 QH
See course description for MSC 1200.

MSC 1701 Honors: Business Statistics 2 4 QH
See course description for MSC 1201.

MSC 1726 Honors: Introduction to Data Processing 4 QH
See course description for MSC 1226.

MSC 1826 Honors: Business Forecasting
Focuses on analyzing data using statistical models from various functional areas of business. Students prepare reports based on actual data that emphasize forecasting.

MSC 1891 Honors Thesis in Progress 0 QH

MSC 1892 Honors Thesis 8 QH

MSC 1893 Honors Thesis in Progress 0 QH

MSC 1894 Honors Thesis 12 QH

Transportation

TRN 1333 The Domestic Transportation System 4 QH
Examines the structure, operations, and problems of the several modes of transportation. Outlines the government role in regulation and promotion. Also highlights the interaction between carriers and shippers in the transportation marketplace. *Prereq.* ECN 1105 and middler standing.

TRN 1344 Corporate Transportation/Logistics 4 QH
Analyzes the role and activities of those involved in corporate transportation/logistics decision making. Emphasizes the importance of transportation planning, inventory control, warehousing, customer service standards, and location decisions in the design and operation of distribution systems. *Prereq.* Junior standing.

TRN 1353 Seminar in Transportation and Logistics 4 QH
Focuses on a limited number of advanced transportation/logistics topics. Offers students experience with business and government through individual research on topics selected for class presentation/discussion. *Prereq.* Senior standing.

TRN 1514 Carrier Management 4 QH
Examines the perspective of those involved in managing the several modes of transportation. Emphasizes the decision-making process related to such issues as carrier financing, pricing, labor relations, and equipment selection. *Prereq.* TRN 1333.

TRN 1528 Urban Transportation 4 QH
Focuses on the movement of people and freight in and around metropolitan areas. Examines the role of transit managers in planning, implementing, and operating mass transit systems. Also outlines how various governmental units participate in financing and regulating urban transportation. *Prereq.* Middler standing.

TRN 1591 Independent Study 1 QH
This course is for the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a

supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

TRN 1592 Independent Study 2 QH
Same as TRN 1591.

TRN 1593 Independent Study 3 QH
Same as TRN 1591.

TRN 1594, TRN 1595, TRN 1596, TRN 1597 Independent Study 4 QH
Same as HRM 1591.

TRN 1721 Labor/Management Issues in Transportation 4 QH

Focuses on labor in the transportation industries. Examines trends in employee compensation, produc-

tivity, bargaining patterns, and influence of government policies on labor/management issues. *Prereq.* TRN 1333.

TRN 1760 International Transportation and Logistics Management 4 QH

Examines the current and future status of ocean and air transportation in international trade and development. Also analyzes the activities of those involved in logistics planning in multinational companies. *Prereq.* *Middler standing.*

TRN 1891 Honors Thesis in Progress 0 QH

TRN 1892 Honors Thesis 8 QH

TRN 1893 Honors Thesis in Progress 0 QH

TRN 1894 Honors Thesis 12 QH

Counseling Psychology, Rehabilitation, and Special Education

CRS 1030 Introduction to Emotional Disturbances in Children 4 QH

Reviews emotional processes that interfere with learning activities; studies approaches used to deal with behavioral disorders. Emphasizes classroom management techniques, use of consultation, and parent-teacher interaction.

CRS 1200 Introduction to Special Education 4 QH

Surveys the characteristics and the social, emotional, and educational adjustment of special-needs children and youth. Evaluates the effects of society's attitudes, the individual's own attitude toward the handicap, and the effect of the handicap itself. Reviews current legislation.

CRS 1300 Introduction to Learning Disabilities 4 QH

Surveys behavioral characteristics of children who present specific deficits in perceptual, integrative, or expressive processes that impair learning efficiency. Emphasizes student evaluation, development of curriculum materials, and adaptation of teaching methods.

CRS 1301 Diagnostics in Special Education 4 QH

Focuses on developing competence in the formal and informal assessment of children's learning needs. Also emphasizes observing, recording, and analyzing children's behavior and learning environments. *Prereq.* CRS 1200 and CRS 1300.

CRS 1302 Methods and Materials of Teaching in Special Education 4 QH

Focuses on the following areas: development and implementation of individualized educational plans; task analysis; adaptation and selection of materials; strategies in applied classroom management techniques; and adaptation and selection of materials and strategies in language arts, mathematics, and perceptual-motor skills. *Prereq.* CRS 1200, CRS 1300, CRS 1301, or senior status.

CRS 1304 Socio-Psycho Dynamics of Family Life 4 QH

Introduces and surveys the internal and external dynamics of family life. Examines the significance of such dynamics to the mental health of the special needs child. Explores approaches to working with parents in home-school relationships, as well as the effects of disability on the family.

CRS 1305 Psychology of the Mentally Retarded 4 QH

Analyzes the etiology, nature, and needs of the retarded individual, emphasizing cognitive and psychosocial development. Explores the implications of these characteristics for life-span management in conjunction with parental and community attitudes and involvement.

CRS 1306 Introduction to Rehabilitation 4 QH

Surveys the field of rehabilitation, including its historical development, psychological implications, and sociological dimensions. Pays special attention to rehabilitation of specific disability groups, such as the physically disabled, the emotionally disturbed, the mentally retarded, alcoholics, drug dependents, and public offenders.

CRS 1310 Intervention Strategies for the Human Services 4 QH

Introduces the wide range of skills used in working with clients in the various helping professions, for example, counseling (individual and group), advocacy, rehabilitation, community organizing, and income maintenance. Utilizes role playing, simulations, and interviews with practicing professionals. Also requires readings, but no fieldwork. Intended as preparation for more specialized courses; required for Human Services majors but open to other students with appropriate backgrounds.

**CRS 1311 Case Management:
Diagnosis and Treatment****4 QH**

Introduces the basic theory and skills of managing client's treatment programs in a variety of institutional settings. Provides training in the identification of the components of a psychosocial assessment, examination of common techniques of planned service delivery and resource coordination, and review of the diverse entitlements available to clients of diverse needs and backgrounds. Utilizes a seminar-like format. *Prereq.* PSY 1111 or SOC 1100.

**CRS 1312 Introduction to Family
Systems Counseling****4 QH**

Introduces the concepts and skills of family systems therapy, a counseling orientation in which the family is the chosen social unit of assessment and intervention for the client's problem. Covers major approaches within communications and structural frameworks, emphasizing implications for normal family development and interventions in dysfunctional systems. Addresses theory and strategies for working with marital and parenting subsystems. Offers students a beginning opportunity to experience how their family affects their professional functioning in various social systems.

Prereq. CRS 1314.

CRS 1313 Introduction to Group Counseling**4 QH**

Provides a foundational exposure to the theory and skills of group counseling as practiced in various human service settings. Covers developmental stages of counseling groups: approaches to leadership style, and strategies for starting, maintaining, and terminating the counseling group. Includes an opportunity for students to practice rudimentary

skills of leadership of counseling groups and to become involved in focused group-process activities. *Prereq.* CRS 1314.

CRS 1314 Introduction to Counseling**4 QH**

Surveys major theoretical approaches to counseling. Provides training and practice in listening skills to aid in the development of facilitative responses. Combines didactic presentations and experiential activities to assist students in understanding and implementing a variety of counseling approaches.

**CRS 1317 Student Teaching and Seminar
in Special Education****8 QH**

Allows for full-time participation in a University-arranged and supervised school program. Gives the student the opportunity to analyze the teaching of and the learning by special-needs students and to demonstrate, evaluate, and develop teaching skills in a variety of classroom settings. *Prereq.* Formal acceptance into and completion of advanced professional sequence with minimum 2.0 Q.P.A. both overall and in teaching major.

CRS 1800 Directed Study**4 QH**

This experience is provided for the student whose unique academic needs or interests cannot be adequately satisfied in any of the scheduled courses of the department. Directed Study requires approval of the supervising faculty member and of the dean's office of the Boston-Bouvé College of Human Development Professions. Approval forms must be submitted to the dean's office during the quarter prior to registration for the directed study. *Prereq.* Permission of instructor.

Education

ED 1003 Reading/Study Skills 1**4 QH**

Provides instruction to students who demonstrate a need to be more efficient in comprehending and studying college textbooks and collateral reading assignments. Concentrates on techniques involved in understanding informative materials and introduces the evaluation of persuasive prose. In addition, presents suggestions on such topics as how to listen to and take summary notes on course lectures and how to set study goals and priorities consistent with course objectives.

ED 1004 Reading/Study Skills 2**4 QH**

Continues topics introduced in ED 1003 and expands upon the analysis and interpretation of persuasive texts. Emphasizes reading imaginative prose for meaning and pleasure, preparing for and taking examinations, and learning to adjust reading speed and method to various materials encountered in concurrent courses.

ED 1005 Practicum in Reading and Study Skills**4 QH**

Gives students in the academic program Project Ujima comprehensive tools to help them to master

the how-to's of reading textbooks, notetaking, outlining, introductory research skills, time management, studying skills, and other techniques necessary for success in college.

ED 1100 Education and Social Science**4 QH**

Draws on anthropology, psychology, and sociology, and some of the concepts, methods, and terminology of those fields. Concentrates on the evolution of human nature, the influence of previous experience and learning on the behavior of individuals and groups, the difficulties in achieving a full degree of humanity in a technological society, and the potentially powerful roles that "professional socializers" (teachers, clinicians, group leaders, and so forth) can play in the lives of students and clients.

ED 1101 Education for the Future:**4 QH****A Creative and Humanistic Approach**

Gives students the opportunity to gain a perspective on the array of conflicting learning experiences that bombard their lives; to identify the factors that influence what people learn and from whom; and to evaluate the potential effects of these learnings.

Encourages students to develop frames of reference through which to examine their own roles in the education process. Utilizes a creative and humanistic approach to teaching.

ED 1102 Human Development and Learning 1 4 QH

Surveys developmental processes from the prenatal period through preadolescence. Covers principles of physical, cognitive, language, social, and personality development and discusses the implications for child-rearing and schooling.

ED 1103 Human Development and Learning 2 4 QH

Presents a basic overview of the continuity of human development in contemporary society, from the pre-adolescent period through adolescence, adulthood, middle age, and old age. Considers significant areas of growth, development, and adjustment for each period, including social, sexual, personality, motivational, and cognitive aspects.

ED 1104 Analysis of the Instructional Process 4 QH

Examines conflicting theories about the nature of teaching and learning. Evaluates the effects of traditional and innovative educational systems on learners. Identifies educational tools for describing, analyzing, and evaluating aspects of learning and teaching; refines students' use of those tools during sequential field observations and class meetings. Requires fieldwork.

ED 1105 Day Care and Nursery Schools: Social and Cultural Origins 4 QH

Explores the origins of the increased contemporary use of out-of-the-family child care arrangements in the United States and in selected European and third-world nations. Covers the interrelation of industrialization, technology, and family functioning; contrasting varieties of child care centers in operation today; and effects of the proliferation of child care centers on other aspects of society, such as neighborhood life, business, parents' lifestyles, elementary school curricula, government spending, and the job market in education and human services. Requires three to four hours per week of fieldwork in child care. *Prereq.* ED 1100 or *equiv.*

ED 1106 Creative Expression in Children 4 QH

Assists students who are interested in working with children in a variety of settings. Focuses on the potential of creative expression in interpersonal communication and the relation of children's creative experiences to their cognitive, emotional, and social development. Provides the opportunity to acquire the hands-on experience and confidence to work with various media available for creative expression. *Prereq.* ED 1102.

ED 1300 Education and Psychosocial Development 4 QH

Examines theories and research on the socialization functions of education. Covers the relative influence of early versus postchildhood socialization and the role of diverse educational experiences and institutions in personality development. *Prereq.* ED 1100 or *equiv.*

ED 1301 Educational Applications of Social Psychology 4 QH

Focuses on theory and research in social psychology especially relevant to education. Covers prejudice in the classroom; the school as a setting for manifestation of authoritarian personality, attitude organization, and change in an educational environment; the class and the clique as small groups, the expression of need for achievement in various school structures; and other related topics. *Prereq.* ED 1102 or ED 1103.

ED 1302 The Human Services Professions 4 QH

Explores what a human service agency is, how it comes into being, how it grows and changes. Analyzes attitudes, values, skills, and knowledge of the human services worker and the reasons why people in modern society require human services assistance. Views human services from the eyes of clients as well as society as a whole. Requires fieldwork in a human service agency as well as a good deal of independent study. Required for all human services majors; open to other students on space-available basis. *Prereq.* ED 1100, SOC 1100, or *equiv.*

ED 1303 Mental Health in Teaching 4 QH

Investigates the factors involved in the choice of teaching as a career and the psychological and occupational factors that contribute to teacher happiness, dissatisfaction, adjustment, and maladjustment. Examines what teachers can do to foster healthy personalities, how to deal with psychological forces in the classroom, and how to strengthen the emotional development of the normal child. *Prereq.* ED 1102 or ED 1103.

ED 1304 Language and Cognition: Educational Implications 4 QH

Focuses on the development of language and thought in the child. Includes such topics as concept attainment and problem solving and the relationship of language to cognitive functioning. Gives particular consideration to the educational implications of the material. *Prereq.* ED 1102 or ED 1103.

ED 1305 Cross-Cultural Studies of Child Rearing and Education 4 QH

Examines child rearing and child life in contrasting cultures around the world. Emphasizes cognitive, emotional, and behavioral outcomes of concern to American educators, human services workers, and parents. Considers alternative patterns of child rearing possibly useful in modern society. Focuses on ethnographic descriptions of particular cultures and psychological comparisons of children from contrasting backgrounds. *Prereq.* ED 1102 or ED 1103.

ED 1306 Measurement and Evaluation 4 QH

Emphasizes evaluation techniques for use in the classroom and teaching-learning situations at all levels. Explores the importance of establishing behavioral objectives as a basis for evaluation. Places considerable emphasis on improving teacher-made tests, especially objective-type tests. Requires students to construct an objective test in their discipline for an instructional unit. Also reviews other evaluation techniques besides tests. Gives brief attention to

standardized measurement instruments of ability and achievement as they may be used in the evaluation of pupil progress.

ED 1307 Introduction to Educational Statistics 4 QH

Emphasizes descriptive statistics useful in the evaluation of educational and related professional activities. Covers statistical notation, variability, probability, sampling techniques, linear regression, correlation, t-tests, and chi-square tests of significance. Draws, as much as possible, examples of applications of these techniques from the fields for which students in the course are preparing.

ED 1308 Education and Social Change 4 QH

Explores, in a sociological context, educational systems as independent and dependent variables in social change. Analyzes instances of planned educational change in various countries and their implications for contemporary American society. *Prereq. ED 1100 or equiv.*

ED 1309 Organization and Politics of School Systems 4 QH

Considers the political sociology of school systems in the United States. Analyzes the power and authority structures in contemporary education. Who decides what and how? Who controls the system? How are the various interest groups organized? What are the mechanisms for conflict resolution? Examines the relation between professional and non-professional interest groups. *Prereq. ED 1100 or equiv.*

ED 1310 Class and Ethnic Relations in Education 4 QH

Focuses on the various ways in which the American class system and patterns of ethnic group relations have affected, and have been affected by, American education. Analyzes the limitations and potential of educational institutions for resolving intergroup conflicts and the establishment of equal educational opportunities. *Prereq. ED 1100 or equiv.*

ED 1311 Schools as Social Systems 4 QH

Analyzes schools as sociocultural subsystems within the larger society. Explores functional interrelation between student and school subcultures, status and role systems, authority structures in American schools. *Prereq. ED 1100 or equiv.*

ED 1312 Comparative Education 4 QH

Compares the national school systems of selected foreign countries with the school system in the United States. Includes comparative data in the fields of teaching, speech and hearing, special education, and human services.

ED 1313 Current Issues in American Education 4 QH

Analyzes the current issues confronting teachers, speech and hearing clinicians, special education practitioners, and human services specialists. Attempts to place these issues in a historical context.

ED 1314 Philosophy of Education 4 QH

Helps participants to examine their own purposes in relation to those of the school as an institution. Studies philosophical writings on topics such as the ethics of educational intervention, the delineation of

educational concepts, the educational messages of long-range speculations and utopias, and normative assumptions underlying educational policies.

ED 1315 Seminar in Human Learning and Motivation 4 QH

Examines the relationship between human learning and motivation in the developmental process and in the classroom. Requires students to select a relevant issue, research it, and report their results to the seminar. *Prereq. ED 1102 or ED 1103.*

ED 1316 Seminar in Adolescent Psychology 4 QH

Examines in depth the motivational, intellectual, social, and emotional development of adolescents, from the end of preadolescence to the beginning of young adulthood. Gives special attention to current issues such as drug use, sexual behavior, and vocational choice. Requires each student to examine a topic of choice in some depth. *Prereq. ED 1103.*

ED 1317 Seminar in Group Process 4 QH

Studies the structure, dynamics, and function of face-to-face groups to learn about goal achievement and task orientation. Operates mainly by committee or group instrumentation. Focuses on gaining an understanding of the function of informal relationships within formal organizations, the various roles within groups, peer relationships, superior-subordinate relationships, authority and intimacy, and the inclusion and exclusion processes.

ED 1318 Seminar in Early Childhood Development 4 QH

Focuses on views of cognitive, personality, and social development during early childhood. Discusses the implications of these views. Requires each student to carry out a project in the field placement and report results to the seminar. *Prereq. ED 1102.*

ED 1400 Fundamentals of Reading 1 4 QH

Introduces developmental reading for prospective early childhood and elementary teachers. Emphasizes beginning reading as it relates to the clinical environment. Studies areas of skill development, such as word recognition and meaning comprehension, in detail, as well as some methods and techniques of testing and grouping. Also introduces some reading books and materials, methods of teaching, and the psychology of learning to read.

ED 1402 Fundamentals of Reading 2 6 QH

Continues topics introduced in ED 1400. Focuses on study skills, and speed and fluency development. Extends the tutorial work and gives the student further opportunity to achieve familiarity with books, materials, and methods. *Prereq. ED 1400.*

ED 1403 Remedial Reading 4 QH

Familiarizes prospective teachers with some of the most commonly known reading problems in the typical classroom as well as in the Reading Clinic. Analyzes and evaluates the typical diagnoses of such problems and corrective programs. Studies tutorial work with a retarded reader, with each student keeping a log or journal of work with a particular reading problem. *Prereq. ED 1402.*

ED 1404 Linguistics and Reading**4 QH**

Explores the nature of language and relevant English language systems to help students acquire a linguistic perspective on the reading process and reading instruction. Examines pedagogical implications in light of current knowledge about children's language acquisition and use. Evaluates early structural linguistic proposals for teaching reading and considers recent psycholinguistic models of the reading process. Discusses issues concerning the language-different child. *Prereq. ED 1402.*

ED 1405 Literature and Learning Materials for Children and Young Adults**4 QH**

Offers a comprehensive survey of the field of children's literature and literature for young adults. Although designed specifically for prospective teachers (and required of all Early Childhood and Elementary Education majors), may also be taken as an elective by all students. Surveys and evaluates examples of contemporary children's literature and other learning materials used in preschool, elementary, secondary, and remedial programs. Covers such recurring themes as racism and sexism in children's books, controversial books for young children, contemporary illustrators, and banned books.

ED 1406 Elementary Education Curriculum 1**4 QH**

Analyzes various patterns of organizing elementary school curriculum on the basis of the general objectives of the public school system in the United States. Requires students to evaluate and organize units of work that can accommodate children at different developmental levels. Emphasizes the integrated approach to curriculum organization, with language arts, music, and arts as central focus. Requires fieldwork.

ED 1407 Elementary Education Curriculum 2**4 QH**

Describes and evaluates social studies curricula in use in elementary school. Develops criteria to select appropriate social studies content, skills, and attitudinal objectives. Expects students to use these criteria to develop social studies experiences that meet the developmental needs of learners and to shed light on the lives of individuals and groups within different cultural settings. *Prereq. ED 1406.*

ED 1408 Elementary School Math**4 QH**

Focuses on methods and materials of mathematics for Early Childhood and Elementary Education majors. Provides the opportunities for University students to explore various strategies and materials of teaching mathematics in a manner that takes into account the developmental stages of children. Requires fieldwork.

ED 1409 Elementary School Science**4 QH**

Surveys methods and materials of science for Early Childhood and Elementary Education majors. Offers the student the opportunity to explore some limited but varied content areas in science and to consider how these areas can be taught to children.

ED 1410 Methods and Materials for Teaching Adolescents and Adults 1**4 QH**

Considers specific methods and materials appropriate to teaching adolescents and adults. Seeks to develop in the students an understanding of the complexities of the materials and methodology of the teaching-learning process, to encourage within students attitudes conducive to and identified with good tenets of teaching, and to foster in the students acceptance of the need to grow constantly and to be aware of the continuing development of the learning-teaching process. Requires fieldwork. *Prereq. ED 1104.*

ED 1411 Methods and Materials for Teaching Adolescents and Adults 2**4 QH**

Focuses on the various subject areas of teaching techniques of organizing and presenting lessons, developing teaching materials, using audiovisual equipment, developing and implementing evaluation instruments, and selecting appropriate materials within the field of interest. Requires fieldwork. *Prereq. ED 1410.*

ED 1412 Fundamentals of Curriculum Development**4 QH**

Examines how goals and objectives are selected and priorities are determined. Analyzes methods for designing educational programs to meet specified goals, methods of evaluating educational outcomes in terms of the goals of the program, and techniques for modifying programs in the light of such performance.

ED 1413 Writing and the Teaching of Writing**4 QH**

Studies the logical and rhetorical bases of exposition and argumentative writing; relationships of assumptions, assertions, and implications; the nature of proof in the sciences, social sciences, and humanities; strategies of argumentation; and the effective consequences of word choice and sentence structure. *Prereq. ED 1104.*

ED 1414 Current Issues in Teaching the Gifted and Talented**4 QH**

Examines issues that affect the type and quality of education available to the gifted and talented in the United States. Describes and evaluates various approaches and programs and reaches conclusions about their effectiveness. Examines research findings on the needs of this segment of the population of learners in order to provide some criteria for future curriculum development.

ED 1415 Teaching Reading to Adolescents and Adults**4 QH**

For secondary education students who are preparing for teaching in the junior or senior high school. Emphasizes language and symbolic process, word recognition, meaning comprehension, and methods and techniques of testing and grouping.

ED 1416 Supervised Field Placement: Early Childhood**2 QH**

Provides a University-arranged institutional placement that allows students to provide educational,

remedial, and/or custodial services to children generally of ages two through five. Provides an opportunity to analyze, develop, demonstrate, and evaluate skills and techniques in guiding the activities of children in nursery schools, day care centers, and/or kindergartens.

ED 1417 Student Teaching and Seminar 8 QH
Allows for full-time participation in a University-arranged and -supervised school program designed to analyze learning and teaching and to demonstrate, evaluate, and develop teaching skills. *Prereq.* Formal acceptance into and completion of advanced professional sequence with minimum 2.0 Q.P.A., both overall and in teaching major.

ED 1800 Directed Study 1 4 QH
This experience is provided for the student whose unique academic needs or interests cannot be adequately satisfied in any of the scheduled courses of the department. Preparation consists of approval of the supervising faculty member and the dean's office of the Boston-Bouve College of Human Development Professions. Approval forms must be submitted to the dean's office during the quarter prior to registration for the directed study. *Prereq.* Permission of instructor.

ED 1801 Directed Study 2 4 QH
For students who have completed ED 1800.

INT 1100 Beginning Computer Use 4 QH
Introduces students who are unfamiliar with software applications to computer use through general purpose software: word processing and data processing. Covers operating system commands as well as concepts relating to computer hardware and software. Suggests methods of applying the computer to study requirements in college.

INT 1330 Field Experience in Human Services 1 4 QH
Human services students are required to fulfill two fieldwork placements during the last two years of their program. Each placement consists of 150 hours on site. The type of placement varies according to the student's interest. Field experiences are supervised by University staff to maximize the student's learning opportunity.

INT 1331 Field Experiences in Human Services 2 4 QH
See course description for INT 1330. *Prereq.* INT 1330, junior or senior status, and permission of instructor.

Health, Sport, and Leisure Studies

HSL 1100 Beginning Swimming 1 QH
Focuses on basic swimming skills to non-swimmers, with emphasis on personal water safety.

HSL 1101 Intermediate Swimming 1 QH
Focuses on basic and advanced swimming skills, with emphasis on form and efficiency. *Prereq.* HSL 1100 or equiv.

HSL 1104 Advanced Life Saving 2 QH
Focuses on Red Cross life-saving skills, techniques, and theory; Red Cross certification possible. *Prereq.* HSL 1101 or equiv.

HSL 1105 Water Safety Instructor 2 QH
Focuses on techniques, theory, and instruction methods in swimming and life-saving courses; Red Cross certification possible. *Prereq.* HSL 1101, HSL 1104.

HSL 1106 Beginning Scuba 2 QH
Focuses on basic skin-diving and scuba-diving skills, with emphasis on safety. *Prereq.* HSL 1101 or equiv.

HSL 1107 Sailing 1 QH
Focuses on basic skills in sailing.

HSL 1109 Beginning Gymnastics 1 1 QH
Introduces, in a coeducational approach, basic skills in floor exercise, vaulting, balance beam, parallel bars, uneven bars, high bar, and rings.

HSL 1110 Women's Gymnastics 2 1 QH
Focuses on knowledge and skills necessary to perform the beginning compulsory routines on the balance beam, floor exercise, uneven bars, and vaulting. *Prereq.* HSL 1109.

HSL 1112 Men's Gymnastics 2 1 QH
Focuses on skills and knowledge necessary to perform beginning compulsory routines on the high bar, side horse, rings, floor exercise, parallel bars, and vaulting horse. *Prereq.* HSL 1109.

HSL 1114 Badminton 1 QH
Focuses on basic badminton strokes, concepts, rules, strategies, and game play.

HSL 1116 Tennis 1 QH
Focuses on basic tennis strokes, concepts, rules, strategies, and game play.

HSL 1118 Beginning Archery 1 QH
Focuses on selected skills in target shooting; provides practical experience in archery games, novelty events, and conduct of tournaments.

HSL 1120 Beginning Golf 1 QH
Focuses on fundamental golf skills, knowledge of clubs and their use, and golf etiquette.

HSL 1121 Beginning Self-Defense 1 QH
Surveys the principles and fundamental skills at the beginning and intermediate levels.

HSL 1123 Beginning Wrestling 1 QH
Focuses on basic wrestling maneuvers. Stresses fundamental breakdowns, escapes, takedowns, rides, and pinning combinations. Discusses rules and scoring procedures and modified matches. Lab fee.

HSL 1124 Beginning Fencing 1 QH
Focuses on basic foil fencing; provides introduction to competition.

- HSL 1126 Karate** 1 QH
Focuses on fundamental techniques of unarmed combat for self-defense using the punches, kicks, and blocks of Tae Kwan Do/Karate.
- HSL 1127 Karate 2** 1 QH
Continues HSL 1126, with progression to more complex techniques and combinations of punches, kicks, and blocks related to Tae Kwan Do/Karate. *Prereq.* HSL 1126.
- HSL 1129 Beginning Ice Skating** 1 QH
Focuses on recreational ice-skating skills for beginners.
- HSL 1130 Figure Skating** 1 QH
Focuses on beginning and intermediate figure-skating skills. *Prereq.* HSL 1129 or permission of instructor.
- HSL 1131 Yoga** 1 QH
Introduces yoga skills and techniques for men and women at the beginning level.
- HSL 1132 Weight Training** 1 QH
Introduces the principles and use of resistive exercises: isotonic exercise (weights), isometric exercise, and the appropriateness of each.
- HSL 1133 Physical Conditioning** 1 QH
Focuses on assessing one's personal physical fitness level, with emphasis on establishing a personal exercise regimen based on scientific principles of training. Utilizes special sections for different mediums of exercise, such as aerobic dance techniques, running, and circuit training.
- HSL 1134 Aerobic Exercise and Dance** 1 QH
Focuses on aerobic fitness, with strong emphasis on concepts of exercise safety and conditioning.
- HSL 1135 Yoga 2** 1 QH
Focuses on refinement of poses learned in HSL 1131. Introduces more advanced standing and inverted poses, balances, and back bends. *Prereq.* HSL 1131 or *equiv.*
- HSL 1137 Beginning Cross-Country Skiing** 1 QH
Focuses on the fundamental techniques of cross-country skiing.
- HSL 1138 Beginning Skiing** 1 QH
Focuses on fundamental techniques of downhill skiing. Lab fee.
- HSL 1139 Intermediate Skiing** 1 QH
Focuses on downhill skiing, including intermediate and advanced techniques. Emphasizes skill development. Lab fee. *Prereq.* HSL 1138.
- HSL 1140 Basketball** 1 QH
Focuses on knowledge and skills appropriate for playing basketball at the beginning level.
- HSL 1142 Volleyball** 1 QH
Focuses on knowledge and skills appropriate for playing volleyball at the beginning level.
- HSL 1144 Field Hockey** 1 QH
Focuses on knowledge and skills appropriate for playing field hockey at the beginning level.

- HSL 1146 Softball** 1 QH
Focuses on knowledge and skills appropriate for playing softball at the beginning level.
- HSL 1147 Baseball** 1 QH
Focuses on knowledge and skills appropriate for playing baseball at the intermediate and advanced levels. *Prereq.* HSL 1146 or permission of instructor.
- HSL 1148 Women's Lacrosse** 1 QH
Focuses on knowledge and skill appropriate for playing lacrosse at the beginning level.
- HSL 1149 Men's Lacrosse** 1 QH
Focuses on knowledge and skills appropriate to play lacrosse at the beginning level.
- HSL 1150 Soccer** 1 QH
Focuses on knowledge and skill appropriate to play soccer at the beginning level.
- HSL 1151 Movement Education** 1 QH
Focuses on concepts and techniques in movement education and exploration for elementary school educators.
- HSL 1152 Folk and Square Dance** 1 QH
Introduces folk and square dance.
- HSL 1153 Modern Dance 1** 1 QH
Introduces modern dance technique and style.
- HSL 1154 Modern Dance 2** 1 QH
Continues HSL 1153, with progression to more complex modern dance techniques and combinations. *Prereq.* HSL 1153 or *equiv.*
- HSL 1155 Modern Dance 3** 1 QH
Continues HSL 1154, with progression into the expressive and choreographic use of modern dance techniques. *Prereq.* HSL 1154 or *equiv.*
- HSL 1156 Ballet 1** 1 QH
Introduces ballet fundamentals, with emphasis on alignment.
- HSL 1157 Ballet 2** 1 QH
Continues HSL 1156, with emphasis on developing lyrical style. *Prereq.* HSL 1156 or *equiv.*
- HSL 1158 Ballet 3** 1 QH
Continues techniques introduced in HSL 1157, with emphasis on expanding the repertory of classical ballet movements. *Prereq.* HSL 1165.
- HSL 1159 Jazz Dance 1** 1 QH
Introduces the fundamentals of jazz dance, with emphasis on alignment.
- HSL 1160 Jazz Dance 2** 1 QH
Continues techniques introduced in HSL 1159, with emphasis on developing jazz dance style. *Prereq.* HSL 1159 or *equiv.*
- HSL 1161 Jazz Dance 3** 1 QH
Continues techniques introduced in HSL 1160, with more complex dance techniques and longer combinations. *Prereq.* HSL 1160 or *equiv.*

HSL 1162 Rhythmic Analysis 1 QH
Analyzes rhythm as it applies to movement skills and dance. *Prereq.* *Dance concentration or permission of instructor.*

HSL 1163 Ballroom Dance 1 QH
Introduces traditional and contemporary partner dancing.

HSL 1164 Ballroom Dance 2
Continues HSL 1163 with progression into more complex dance steps, partnering techniques, and amalgamations. Expands upon dances taught in HSL 1163 and introduces additional ballroom dances. *Prereq.* *HSL 1163.*

HSL 1165 Dance Improvisation 1 QH
Provides the opportunity to practice in the use of dance as a medium for artistic expression. Emphasizes the development of skill in the use of improvisational techniques and in structuring choreographic phrases. *Prereq.* *HSL 1153, HSL 1156, or HSL 1159.*

HSL 1167 Beginning Racquetball 1 QH
Focuses on knowledge and skills appropriate to play racquetball at the beginning level.

HSL 1173 Beginning Track and Field 1 QH
Focuses on the fundamental skills in the various track and field events.

HSL 1202 Recreational Sports Leadership 2 QH
Explores teaching techniques involved in team, dual, and individual sports. Presents and investigates methods, such as the part-whole and whole-part, to establish relevance to each of the sports areas under study. Gives students the opportunity to develop skills in planning units and individual lessons. In addition, expects students to apply practical experience by teaching one lesson in each of the sports areas studied.

HSL 1211 Analysis and Coaching of Softball 2 QH
Focuses on the basic techniques and responsibilities of coaching intramural, interscholastic, and intercollegiate softball, including advanced skill analysis and management. *Prereq.* *HSL 1146.*

HSL 1220 Foundation of Leadership in Leisure Service 4 QH
Focuses on leadership at the program level of employment in the broad field of recreation. Provides the opportunity to practice teaching skills both in the classroom and in a required field lab. Examines a variety of topics concerned with the theoretical foundations of leadership in the leisure service professions through required readings and class discussions.

HSL 1221 Introduction to Recreation and Leisure 3 QH
Provides an overview of the recreation park and therapeutic recreation fields, emphasizing history, scope, rationale, setting, programs and services, basic trends and issues, and future considerations. Explores the basic elements of the fields in relation to society, the leisure profession, and the individual.

HSL 1223 Life/Career Planning 4 QH
Helps students develop life/career planning skills for use in pursuit of a career in health, sport, or leisure studies. Explores a variety of careers, co-op job opportunities, and lifestyles of professionals in the field. Gives students the opportunity to assess their own interests, values, needs, and skills and to develop job-finding skills, including resume writing and interviewing techniques.

HSL 1250 Creative Dance 1 2 QH
Focuses on theory and practice of methods and materials in teaching creative dance to elementary school children. Examines children's performance and appropriate teaching techniques with off-campus observation and experience. Partially satisfies prepracticum requirements for teacher certification at K-9 grade level. *Prereq.* *HSL 1154 or HSL 1165.*

HSL 1251 Creative Dance 2 2 QH
Focuses on theory and practice of methods and materials in teaching creative dance to secondary school youth. Examines performance and teaching techniques with off-campus observation and experience. Partially satisfies prepracticum requirements for teacher certification at 5-12 grade level. *Prereq.* *HSL 1154 or HSL 1165.*

HSL 1252 Dance Composition 1 3 QH
Analyzes the use of space, force, and time—the basic elements of the choreographer's craft. Gives students the opportunity to practice and to solve choreographic problems. *Prereq.* *HSL 1154 or permission of instructor.*

HSL 1253 Group Dynamics 1 3 QH
Introduces group dynamics through selected activities, discussion, and living and working together. Includes a resident living experience for one week at the Warren Center as an integral part of the course. Lab fee.

HSL 1254 First Aid 2 QH
Focuses on emergency care procedures recommended for home, school, and community, including cardiopulmonary resuscitation (CPR). Emphasizes practices endorsed by the American Red Cross.

HSL 1255 Human Movement 3 QH
Introduces the nature and role of human movement and analyzes skillful movement performance through participation and observation. Introduces the objectives, literature, and organization of the profession of physical education.

HSL 1257 History and Philosophy of Physical Education 3 QH
Surveys physical education from ancient times to the present. Analyzes the influence of major philosophical positions on physical education programs.

HSL 1258 Elementary School Activities 3 QH
Focuses on introductory knowledge and skills necessary for teaching physical education to children of

elementary school age. Gives students the opportunity to learn about children's performance and appropriate teaching techniques through observation and actual experience in off-campus schools and learning centers. Partially satisfies the prepracticum requirements for teacher certification at the K-9 level.

HSL 1259 Secondary School Activities 3 QH

Studies physical activity appropriate for secondary school students' level of development and interest. Gives students the opportunity to learn about pupils' performance and appropriate teaching techniques through observation and actual experience in off-campus schools and learning centers. Partially satisfies the prepracticum requirements for teacher certification at the grades 5-12 level.

HSL 1260 Perceptual-Motor Development 4 QH

Studies the development of motor skills from birth through infancy, early childhood, adolescence, and adulthood, including skilled performance of the aged. Considers age expectations for perceptual-motor behavior, with a focus on a functional adequacy in skilled performance. *Prereq. ED 1102 and ED 1103; may be taken concurrently.*

HSL 1261 Anatomy and Physiology 1 4 QH

Focuses on gross anatomy and physiology of the human skeletal, joint, nervous, and muscular systems.

HSL 1264 Adapted Physical Education I 4 QH

Surveys characteristics and attitudes pertaining to special-needs individuals, with particular emphasis on the effects of their presence on current physical activity programs. Includes observations of special-needs programs. Partially satisfies prepracticum requirements for teacher certification at the grade level K-12. *Prereq. HSL 1261 and HSL 1606.*

HSL 1265 Early Childhood Development 4 QH

Studies the development of fundamental motor patterns (run, catch, kick, strike, jump, throw) from ages 0 to 5 years, including perceptual-motor relations operating in vision, audition, and proprioception.

HSL 1266 Physical Conditioning Programming 2 QH

Focuses on how to design and deliver instruction related to physical conditioning and exercises. *Prereq. HSL 1132 and HSL 1133.*

HSL 1268 Basic Athletic Training Laboratory 1 QH

Discusses the biomechanical and anatomical principles as well as indications and contraindications for application of the various wrapping and strapping techniques involved with athletic injuries. Presents the indications for use and types of protective devices (braces, splints, and so forth). Utilizes lab time for practical application and development of skills. *Prereq. Concurrent with HSL 1605.*

HSL 1272 Dance Composition 2 3 QH

Analyzes the choreographic process, including content, form, technique, and projection. Gives students the chance to solve choreographic problems based on literal and nonliteral themes. *Prereq. HSL 1160.*

HSL 1280 Foundations of Health Education 2 QH

Considers the philosophy of health education, the conceptual approach, and trends in health education. Provides opportunities for students to investigate the broad spectrum of career possibilities in community and school health education.

HSL 1281 Current Issues in Health 4 QH

Explores topics of current interest, which may include emotional health, nutrition, fitness, sexuality, drug use, disease, consumer issues, and environmental issues. Emphasizes the needs of the participants.

HSL 1282 Wellness 4 QH

Explores the concept of wellness, examining behaviors and lifestyle choices that lead to a high level of physical, emotional, and spiritual well-being. Covers assessment of health risk, behavioral change, lifestyle analysis, the life cycle, and stress management through self-analysis.

HSL 1283 Introduction to Safety 2 QH

Introduces the principles and fundamentals of safety education as they relate to people in their environment. Concerns safety as a social problem; considers major accident areas, accident causes, and liability; and analyzes possible solutions to accident problems.

HSL 1284 Instructional Resources 2 QH

Introduces the use of audiovisual media as educational tools. Includes production of slide presentations, transparencies, bulletin boards, and displays. Provides opportunities for experiences in operating selected equipment.

HSL 1285 Health Concerns of Youth 4 QH

Applies health concepts to assist youth in reaching a higher level of wellness through preventive measures. Identifies and deals with significant health concerns as they relate to health professionals, teachers, and adults. Partially satisfies the prepracticum requirements for teacher certification grade levels 5-12.

HSL 1286 Nutrition 4 QH

Offers the student the opportunity to learn and evaluate nutrition information both as a consumer and a future educator. Explains the chemical, biological, and physiological bases of nutrition.

HSL 1300 Swimming Analysis 2 QH

Focuses on theory, analysis techniques, and teaching methods in swimming. *Prereq. HSL 1101 or permission of instructor.*

HSL 1301 Analysis and Coaching of Men's Gymnastics 2 QH

Focuses on skills analysis and coaching of men's gymnastics, with emphasis on teaching methods, new trends, and judging. *Prereq. HSL 1113.*

HSL 1302 Analysis and Coaching of Badminton 2 QH

Focuses on analysis of performance, teaching, and coaching in badminton. *Prereq. HSL 1115.*

HSL 1303 Analysis and Coaching of Tennis 2 QH

Focuses on analysis of performance and methods of teaching in tennis. *Prereq.* HSL 1117.

HSL 1306 Analysis and Coaching of Track/Field 2 QH

Focuses on advanced skills analysis and coaching techniques for selected track and field events. Emphasizes analysis of common movement patterns, teaching methods, and coaching techniques. *Prereq.* HSL 1135 or *equiv.*

HSL 1309 Analysis and Coaching of Basketball 2 QH

Focuses on the basic techniques and responsibilities of coaching interscholastic and intercollegiate basketball, including advanced skills analysis, position and team play, conditioning, practice organization, and team management. *Prereq.* HSL 1140.

HSL 1313 Analysis and Coaching of Soccer 2 QH

Focuses on the basic techniques and responsibilities of coaching intramural, interscholastic, and intercollegiate soccer, including advanced skills analysis, position and team play, conditioning, practice organization, and team management. *Prereq.* HSL 1150.

HSL 1315 Analysis and Coaching of Volleyball 2 QH

Focuses on the basic techniques and responsibilities of coaching intramural, interscholastic, and intercollegiate volleyball, including advanced skills analysis, position and team play, conditioning, practice organization, and team management. *Prereq.* HSL 1142.

HSL 1316 Theory of Officiating 2 QH

Covers the knowledge and skills in the basic concepts of officiating individual and team sports.

HSL 1317 Sports Officiating: Team Sports 2 QH

Focuses on theory, practice, and techniques of officiating in team sports, such as basketball and volleyball.

HSL 1318 Sports Officiating: Individual Sports 2 QH

Focuses on theory, practice, and techniques of officiating individual sports, such as tennis and badminton.

HSL 1319 Analysis and Coaching of Softball 1 QH

Focuses on basic techniques and responsibilities of coaching intramural, interscholastic, and intercollegiate softball, including advanced skills analysis and management. *Prereq.* HSL 1146.

HSL 1320 Analysis and Coaching of Gymnastics 2 QH

Focuses on skills analysis and coaching of women's gymnastics, with emphasis on appropriate teaching methods and new trends. *Prereq.* HSL 1111.

HSL 1321 Modern Dance 4 1 QH

Continues techniques introduced in HSL 1155 with emphasis on the application of modern dance technique and style in the performance of modern dance repertory. *Prereq.* HSL 1155 or *equiv.*

HSL 1322 Ballet 4 1 QH

Continues techniques introduced in HSL 1158 with in-depth study of the complicated variations derived from classical ballet. Emphasizes line and expressive interpretation. *Prereq.* HSL 1158 or *equiv.*

HSL 1324 Jazz Dance 4 1 QH

Continues techniques introduced in HSL 1161 with emphasis on style and expressive interpretation. Progresses into the choreographic use of jazz dance. *Prereq.* HSL 1161 or *equiv.*

HSL 1325, HSL 1326, HSL 1327 Dance Rehearsal and Performance 1, 2, 3 1 QH each

Gives students the opportunity to develop skill in performance. Also allows students to choreograph, stage, and perform an original work or perform in the original work of a guest or faculty choreographer. *Prereq.* *Permission of instructor.*

HSL 1400 Organizational Behavior 3 QH

Studies human behavior in groups through lectures, reading, and projects. Concentrates on management skills and employment legislation.

HSL 1401 Program Planning in Recreation 4 QH

Examines in-depth the steps in planning recreation programs in concert with practical experience.

HSL 1402 Leisure and Lifestyles 4 QH

Focuses on aspects contributing to lifestyles and the role of leisure. Examines specific lifestyles through readings and video-taped movies. Gives students the opportunity to examine the effect of leisure on their lifestyles and future aspirations.

HSL 1403 Concepts of Leisure: Sociopsychological Perspectives 4 QH

Explores the various sociopsychological perspectives of leisure and the relations of mores, social structure, roles, values, and personality to leisure expression. Investigates other pertinent social and environmental factors that contribute to the phenomenon of leisure.

HSL 1406 Internship Seminar 1 QH

Offers preparation for professional field assignment in a leisure-service setting. Focuses on identification and assessment of student career goals, analysis of previous volunteer and/or employment experience, professional involvement, and facilitation of the internship placement process.

HSL 1408 Research Methods 4 QH

Studies basic statistics, the use of experimental and quasi-experimental design, sampling, instrumentation, data collection, and analysis as applied in recreation and leisure studies.

HSL 1409 Research Applications 4 QH

Examines the use of research methods in selected professional applications ranging from the ongoing research of faculty to student-originated studies.

HSL 1410 Senior Seminar in Contemporary Issues and Trends in Recreation and Leisure 4 QH

Examines and discusses contemporary issues and trends in the field of recreation and leisure. Focuses on critical aspects of leisure services: legislation, consumer advocacy, professional development, research, and innovations for the improvement of service delivery.

HSL 1421 Management of Recreation and Physical Education Programs 4 QH

Focuses on management procedures of recreation and physical education facilities operations. Emphasizes area and facility design, personnel policies, and problem solving related to administration and management.

HSL 1422 Program Evaluation in Recreation 4 QH

Examines comprehensive systems for evaluating program effectiveness as it relates to the consumer of recreation services. Emphasizes developing an evaluation system for an agency of the student's choice. Draws case studies from the public, non-profit, and commercial sectors.

HSL 1423 Commercial Recreation Marketing 4 QH

Examines commercial and private sector recreation services. Relates case studies, workshops, and practical problems to managing leisure opportunities for resorts, country clubs, theme parks, tourism, sports clubs, manufacturing and merchandising, and industrial recreation.

HSL 1426 Budget Analysis 4 QH

Focuses on the study and use of analytical techniques that can improve budgeting decisions. Considers cost-effectiveness and benefit-cost analysis, efficiency measures, and pricing for solutions to capital and operating-budget problems in the non-profit and commercial recreation sectors.

HSL 1427 Survey of Recreation Facilities 3 QH

Studies fundamental management, administration, and construction concepts for a wide variety of facilities such as parks, centers, arenas, camps, and marinas.

HSL 1446 Elements of Outdoor Recreation Planning 4 QH

Explores the nature and significance of the outdoor recreation experience and how our natural resources can optimally meet people's needs. Focuses on the elements of outdoor recreation planning; identification, evaluation, assessment, and implementation. Includes relation of social groups, natural resources, and environmental concerns to outdoor recreation planning.

HSL 1460 Process of Aging 3 QH

Focuses on aging and public policy in the United States. Uses the Older American Act and related legislation to examine how the partnership among federal, state, and local agencies operate to deliver services to older people. Studies leisure needs and services in the context of congregate living, life-care communities, senior centers, and adult day health care.

HSL 1461 Camping and Outdoor Education for the Handicapped 3 QH

Focuses on innovations in outdoor learning with an emphasis on wellness, the American Indian, outdoor adventure activities, and a holistic perspective on the individual with a disability. Includes observations and practical applications.

HSL 1462 Leisure Counseling 4 QH

Provides students an opportunity to develop fundamental group counseling skills through the use of specialized strategies and traditional verbal counseling techniques. Focuses on lifestyle awareness counseling.

HSL 1463 Overview of Physical Disabilities 4 QH

Offers a holistic and humanistic approach to people with physical disabilities, including amputations, traumatic conditions, sensory impairments, and neurological, orthopedic, and cardiovascular disorders. Studies rehabilitation procedures and treatment, adjunctive therapies, prosthetics, orthotics, assistive devices, and personal care techniques.

HSL 1464 Program Planning in Therapeutic Recreation 4 QH

Examines advanced planning of comprehensive therapeutic recreation services. Focuses on systems approach to planning for individuals and groups. Includes an intensive examination of the philosophy of therapeutic recreation; the study of the functional elements of activities, current legislation, and standards for service delivery.

HSL 1465 Therapeutic Recreation with Developmentally Disabled Persons 4 QH

Reviews major phases of normal growth and development for the purpose of understanding the causes and impact of developmental disabilities. Emphasizes role of play experiences in achieving sequentialized skills and concepts, practices, and procedures employed in program design.

HSL 1466 Foundations of Psychiatric Services in Therapeutic Recreation 4 QH

Focuses on orientation to the foundations of mental health and variables affecting mental illness. Examines various psychiatric disorders and treatment modalities and the role of activity therapy in the treatment of mental illness. Reviews contemporary trends in psychiatry that pertain to therapeutic recreation. *Prereq.* *Permission of the instructor.*

HSL 1467 Social and Psychological Impacts of Illness and Disabilities 4 QH

Explores relevant issues related to disability such as societal attitudes, self-concept, coping, family, grieving, and life restructuring through a mixture of lectures, group discussion, guest speakers, and films. Examines self in the role of change agents and care providers. *Prereq.* *HSL 1463.*

HSL 1500 Mental Health 4 QH

Investigates emotional health and well-being as they relate to total health, with emphasis on factors that influence emotional behavior. Includes various approaches to emotional health in school programs and the community.

HSL 1502 Communicable and Degenerative Diseases 4 QH

Focuses on the disease immunity process, with emphasis on prevalent communicable diseases in the

United States today and their transmission. Also studies chronic diseases, cardiovascular diseases, cancer, diabetes, and other constitutional and degenerative diseases and disorders that affect the nation's health.

HSL 1503 Human Sexuality and Family Dynamics 4 QH

Examines sexuality from a physical, psychological, social, historical, and cultural perspective; needs and concerns about sexuality at various stages in life, including a variety of approaches to sex education in schools, community, and the family.

HSL 1504 Longevity and Aging 4 QH

Studies the biological, psychological, and sociological aspects of human aging. Considers the importance of one's current lifestyle in relation to the phenomenon of longevity and the quality of life.

HSL 1506 Evolving Patterns of Community Health Education 4 QH

Analyzes principles of community health, with emphasis on contemporary local, national, and international organizations for meeting health problems. Considers health care delivery, consumer health issues, environmental health, community resources, and the role of health education in the community.

HSL 1507 Seminar 1 2 QH

Introduces research and scientific writing, culminating in a research project in an area of special interest. *Prereq.* ED 1306.

HSL 1508 Seminar 2 2 QH

Discusses current problems and new developments as they relate to health education in school and in a variety of community settings. *Prereq.* HSL 1507.

HSL 1509 Organization and Administration of Health Education Programs 4 QH

Examines principles and methods of organization and administration of school and community health education programs. Covers ethics, personnel, budget, facility management, and priorities.

HSL 1510 Health Counseling 4 QH

Identifies physical, mental, emotional, and social health problems; remedial procedures; and counseling techniques to aid health educators in dealing more effectively with various health problems. *Prereq.* Juniors and seniors only.

HSL 1511 Independent Study 1 1 QH

HSL 1512 Independent Study 2 2 QH

HSL 1513 Independent Study 3 3 QH

HSL 1514 Independent Study 4 4 QH

Provides the student with an opportunity for concentrated planning and research in a topic area of health, sport, or leisure. Requires student to submit outline of proposed study.

HSL 1515 Public Health Administration 4 QH

Presents history and overview of public health agencies and the organization of services for meeting public health needs at the local, state, federal, and international levels. Focuses on today's major health problems and services.

HSL 1516 Drug Use and Abuse 4 QH

Explores the use and abuse of drugs in our society, including prescription and OTC drugs, alcohol, and tobacco. Examines physiological, psychological, and sociological effects of drugs on humans.

HSL 1517 Death, Bereavement, and Suicide 4 QH

Presents an interdisciplinary approach to the contemporary issues involved in death and bereavement. Examines death from a lifecycle approach, including the dynamics of grief and mourning. Discusses suicide as it relates to self-concept and stress.

HSL 1518 Assessment of Community Health 4 QH

Focuses on today's major community health problems, with an overview of the methods of assessment and evaluation of health needs at the local, state, federal, and international levels.

HSL 1585 Teaching Procedures in Health Education in School and Community 4 QH

Introduces the prospective health educator to health education curriculum, techniques of planning, and pertinent methods and materials in school and community health education. Partially satisfies the pre-practicum requirements for teacher certification at grade levels 5–12. *Prereq.* ED 1104 and HSL 1285.

HSL 1600 Psychology of Sport 2 QH

Analyzes the psychological behavioral patterns and deviations of sports participants, including spectators and coaches. Emphasizes emotions, motivation, competition, and learning factors. Discusses current sports highlights. *Prereq.* Physical education major or permission of instructor.

HSL 1601 Sociology of Sport and Dance 2 QH

Studies sport and dance as social institutions, including theories explaining the role of each in contemporary society and the part of each in evolving societies. *Prereq.* Permission of instructor.

HSL 1602 Theory of Coaching 2 QH

Analyzes learning principles, sociology, and psychology as applied to coaching individual, dual, and team sports. Presents techniques and standards of squad recruitment, organization, leadership, and coaching ethics.

HSL 1603 Theory of Play 2 QH

Examines the nature of play and cross-cultural patterns of play. Investigates selected theories of play, including Huizinga, Caillois, Sutton-Smith, and Lee.

HSL 1604 Group Dynamics 2 2 QH

Exposes students to outdoor activities typical of outdoor adventure programs and to practices and philosophies of Project Adventure, Outward Bound, and national outdoor leadership schools. Emphasizes skills teaching. Requires resident experience. Lab fee. *Prereq.* HSL 1253.

HSL 1605 Basic Athletic Training 3 QH

Focuses on the training and conditioning procedures in athletic programs. Emphasizes the prevention of athletic injuries. Examines roles of the trainer, athlete, coach, and health service.

- HSL 1606 Perceptual-Motor Learning** 4 QH
Focuses on how information processing is involved in perceptual-motor learning and performance. Applies basic research data to learning and executing skills in a variety of sports settings. *Prereq.* PSY 1111 or equiv.
- HSL 1607 Measurement and Evaluation** 4 QH
Discusses construction, use, selection, and interpretation of evaluative tools applicable to health, sport, and leisure studies. Examines elementary statistical methods. *Prereq.* ED 1307.
- HSL 1608 Clinical Athletic Training** 2 QH
Introduces the student athletic trainer to clinical experience with an opportunity to practice the various skills for evaluation and treatment of the injured athlete. *Prereq.* HSL 1605.
- HSL 1609 Advanced Athletic Training** 4 QH
Presents the advanced preparation and utilization of conditioning programs and their administration for prevention and care of injuries associated with competitive athletics. *Prereq.* HSL 1605.
- HSL 1610 Anatomy and Physiology 2** 4 QH
Examines gross anatomy and physiology of the human cardiovascular, respiratory, digestive, urinary, and endocrine systems. Also covers metabolism, calorimetry, and other applied topics. *Prereq.* HSL 1261.
- HSL 1611 Kinesiology** 4 QH
Investigates science of human motion and anatomic and mechanical principles as they relate to an understanding of skillful, efficient, and purposeful human motion. Examines the internal and external forces acting on a human body and their effects. *Prereq.* HSL 1261.
- HSL 1612 Physiology of Exercise** 4 QH
Studies the immediate and long-range effects of exercise on the human body, with emphasis on the cardiovascular and respiratory systems, muscles, and metabolism; physical fitness, body composition, and selected components of motor performance—assessment techniques and training principles. Introduces indirect open-circuit calorimetry and EKG monitoring. *Prereq.* HSL 1610.
- HSL 1613 Laboratory in Exercise Testing and Prescription** 4 QH
Presents a practicum in assessment of functional cardiovascular, muscular strength, muscular endurance, flexibility, and body composition. Gives students the opportunity to prescribe exercise programs used to improve functions through volunteer work as an exercise test technician and exercise leader in a fitness class. *Prereq.* HSL 1612.
- HSL 1614 Electrocardiography** 4 QH
Studies basic and intermediate electrocardiography, including cardiac function, lead systems, rate, rhythm, axis, infarction, ischemia, hypertrophy, effects of cardiovascular drugs, and effects of exercise. *Prereq.* HSL 1612.
- HSL 1615 Critical Teaching Skills** 4 QH
Analyzes direct and indirect, verbal and nonverbal teaching methods for classroom and activity teaching, using techniques such as microteaching, peer teaching, and simulation. Examines techniques for measuring teacher behavior, such as interaction analysis. Requires a lab experience in an education setting. Partially satisfies prepracticum requirements for teacher certification. *Prereq.* HSL 1258 or HSL 1259; *prepracticum experience.*
- HSL 1616 Curriculum Development** 3 QH
Focuses on basic foundations of curriculum development. Stresses fundamental principles and guides to curriculum organization, format, and evaluation. Includes experience using the taxonomies of education objectives and survey of existing curricula and current curriculum trends.
- HSL 1618 Exercise and Activities for the Older Adult** 4 QH
Studies principles of physical activity and the organization of physical activity programs for the elderly in public and private agencies. Requires research and practical applications of theory.
- HSL 1621 Dance in Cultural Perspective** 4 QH
Surveys dance from ancient times to 1900 with the focus on the evolution of dance as a theater art.
- HSL 1625 Senior Seminar** 4 QH
Provides an opportunity for senior students to discuss pertinent new topics and concepts in sports medicine. *Prereq.* *Permission of instructor.*
- HSL 1626 Therapeutic Reconditioning for Athletic Training** 4 QH
Covers principles and objectives inherent in the rehabilitation process of athletic injuries. Discusses basic rehabilitation fundamentals, as well as specific conditioning and reconditioning techniques. Exposes the student to the different types of exercise, as well as the different rehabilitative equipment used in a rehabilitation program. Provides laboratory experiences in the application of exercise programs and use of equipment. *Prereq.* HSL 1627.
- HSL 1627 Therapeutic Modalities for Athletic Training** 4 QH
Presents physical agents used in athletic training with regard to their physiological effects, where in the healing process they may be used, and all indications and contraindications for use. Utilizes laboratory experiences in application of those physical agents. *Prereq.* HSL 1605.
- HSL 1630 Aspects of Dance** 3 QH
Introduces dance forms, functions, and styles. Analyzes dance as an art and surveys dance professions. Includes lectures, lab, and attendance at performances.
- HSL 1632 Dance in the Twentieth Century** 4 QH
Surveys dance in the twentieth century. Focuses on the emergence and development of modern dance and the impact of twentieth-century choreographers on the classical ballet tradition. Uses slides and films

to illustrate the choreographic innovations of artists such as Graham, Nikolais, Tharp, Fokine, Balanchine, and Bejart. *Prereq.* HSL 1621.

HSL 1634 Laban Movement Analysis 2 QH
Introduces Laban's qualitative system of movement description and behavior. Emphasizes the study of effort, shape, and space harmony.

HSL 1777 Honors Adjunct 1 QH
To be added to any four-credit course in the department when approved by the Honors Committee of Boston-Bouvé. Once approved, the adjunct information is forwarded to the honors office for dissemination to the honors membership. Allows enrollment an unlimited number of times as an adjunct to any health, sport, and leisure studies course at different times during a given academic year.

HSL 1800 Supervised Field Experience 1 6 QH
When combined with another approved field-based course (HSL 1801 or HSL 1803), offers assignment in a field setting related to the student's area of study within the curriculum, including observing and performing professional skills under the guidance of a certified cooperating field professional and college supervisor. Includes supervision, evaluation conferences, and seminars as an integral part of this experience. Taken by HSL majors not in teacher preparation.

HSL 1801 Supervised Field Experience 2 6 QH
When combined with another approved field-based course (HSL 1800 or HSL 1802), offers assignment in a field setting related to the student's area of study within the curriculum, including observing and performing professional skills under the guidance of a certified cooperating field professional and college supervisor. Includes supervision, evaluation conferences, and seminars as an integral part of this experience.

HSL 1802 Supervised Student Teaching 1 6 QH
Provides a supervised teaching experience in an approved school in which the student assumes clear instructional responsibilities for at least half of the time and full teaching responsibilities for a substantial period of time under the guidance of a certified cooperating teacher and college supervisor. Must be at the level of the teacher certification sought.

Includes supervision, evaluation conferences, and seminars as an integral part of this experience. Taken by students who wish to apply for teacher certification. Allows a minimum of 300 clock hours for teacher certification to be achieved when the student successfully completes this course and HSL 1801 or HSL 1803. These courses should be taken in the same quarter.

HSL 1803 Supervised Student Teaching 2 6 QH
Provides a supervised teaching experience in an approved school in which the student assumes clear instructional responsibilities for at least half of the time and full teaching responsibilities for a substantial period of time under the guidance of a certified cooperating teacher and college supervisor. Must be at the level of the teacher certification sought. Includes supervision, evaluation conferences, and seminars as an integral part of this experience. Taken by students who wish to apply for teacher certification. Allows a minimum of 300 clock hours for teacher certification to be achieved when the student successfully completes this course and HSL 1801 or HSL 1802. These courses should be taken in the same quarter.

HSL 1805 Supervised Student Teaching 3 6 QH
Extends HSL 1802 and HSL 1803 to accommodate students pursuing certification at two levels and who require the additional student teaching practicum of an additional 150 hours. May also be used by student teachers needing extra involvement to meet certification standards not met during HSL 1802 and HSL 1803.

HSL 1863 TAC—Special Problems 2 QH
Presents directed study in analysis and coaching of a sport or activity not offered by the department or in special scheduling situations, for example, field hockey, football, lacrosse, wrestling. *Prereq.* *Permission of instructor.*

HSL 1866 Special Problems 4 QH
Focuses on independent, faculty-supervised investigation in an area of each student's interests. Culminates in a formal written report. Teacher certification requirements available in 3 Dockser Hall. *Prereq.* *Permission of instructor.*

Physical Therapy

PTH 1114 Introduction to Physical Therapy 1 2 QH
Provides orientation to the field of physical therapy and its role in the health professions. Explores theory and practice in applied body mechanics and basic procedures related to patient management.

PTH 1115 Introduction to Physical Therapy 2 2 QH
Provides practice in the preparation of patients and equipment for various treatment procedures.

Focuses on theory demonstration and practice in heat, light, and hydrotherapy.

PTH 1118 Development Base of Human Performance 4 QH
Studies the growth and development of perceptual-motor skills from birth to old age. Considers age expectations for perceptual-motor behavior, focusing on the processes underlying developmental changes.

PTH 1310 Clinical Gross Anatomy**6 QH**

Regionally covers the structure and function of the human body, with particular emphasis on the skeletal, muscular, nervous, and vascular components of each region. Involves lectures, cadaver prosection, osteology labs, and surface anatomy palpation to investigate basic human anatomy and the clinical applications of anatomy lab. *Prereq.* BIO 1254 and BIO 1255.

PTH 1315 Physiology for Physical Therapists**5 QH**

Covers neuromuscular, cardiovascular, and respiratory physiology applied to physical therapy. *Prereq.* BIO 1254, BIO 1255, and PTH 1115.

PTH 1320 Physical Therapy 1**2 QH**

Offers theory, demonstrations, and practice of manual therapy integrated with other treatment procedures. Also covers anatomical and physiological theory and principles. Uses problem solving and case analyses. *Prereq.* BIO 1254, BIO 1255, and PTH 1115.

PTH 1325 Clinical Medicine 1**4 QH**

Covers general medicine, lab medicine, and pathology as related to conditions commonly treated by physical therapists. *Prereq.* BIO 1254 and BIO 1255.

PTH 1330 Clinical Kinesiology**5 QH**

Studies normal movement through analysis of muscle and joint function. Also gives clinical applications for pathological movement. Includes lab. *Prereq.* PTH 1310 and PTH 1315.

PTH 1335 Physical Therapy 2**3 QH**

Covers evaluation procedures, including theory, demonstration, practice, and planning. *Prereq.* PTH 1310, PTH 1315, and PTH 1320.

PTH 1340 Physical Therapy 3**4 QH**

Covers basic therapeutic exercise, including theory, demonstration practice, and planning. *Prereq.* PTH 1114, PTH 1115, PTH 1310, PTH 1315, PTH 1320.

PTH 1345 Clinical Medicine 2**3 QH**

Focuses on orthopedic conditions and their medical, surgical, and physical therapy treatment. *Prereq.* PTH 1310, PTH 1315, and PTH 1325.

PTH 1352 Psychosocial Aspects of Illness**3 QH**

Examines interpersonal relationships among patients, families, health professionals, and society, with reference to the impact of and reaction to illness. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1355 Physical Therapy 4**3 QH**

Covers theory, demonstration, and practice in prosthetics, orthotics, and advanced functional training of spinal cord-injured patients. *Prereq.* PTH 1315, PTH 1330, PTH 1335, PTH 1340, and PTH 1345.

PTH 1360 Physical Therapy 5**4 QH**

Presents theoretical basis and clinical application of integrated approaches to treatment of neurologically impaired clients. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1366 Neuroanatomy**5 QH**

Examines morphology and function of the human nervous system. Covers abnormalities of structure and function of the nervous system. Includes lecture and lab. *Prereq.* PTH 1340.

PTH 1370 Clinical Seminar**2 QH**

Discusses selected topics related to clinical aspects in physical therapy. Considers interpersonal relationships, ethics, teaching-learning process, communication, group dynamics, medical-legal issues, sociocultural/socioeconomic considerations, and clinical education information. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1375 Physical Therapy 7**2 QH**

Covers theory, demonstration, and practice in electrical testing and treatment procedures. *Prereq.* PTH 1335, PTH 1345, and PTH 1366.

PTH 1380 Supervised Clinical Education 1**5 QH**

Introduces clinical experience that provides the student with opportunities to practice various skills in the evaluation and treatment of patients under supervision. Requires five weeks during Quarter 9 of the junior year in Massachusetts. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1385 Clinical Medicine 3**3 QH**

Focuses on the pediatric and neurologic aspects of physical therapy practice, including review of symptoms, conditions, and therapeutic intervention. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1390 Physical Therapy 6**3 QH**

Covers respiratory physical therapy, including theory, demonstration, and practice in the management of medical and surgical chest conditions. Introduces respiratory mechanical equipment and cardiopulmonary resuscitation. *Prereq.* PTH 1315, PTH 1330, PTH 1335, and PTH 1340.

PTH 1395 Physical Therapy 5 (PTH 1360 continued)**1 QH**

Covers neurodevelopmental treatment, neurophysiological theory, and clinical application of facilitation and inhibition techniques to enhance motor control. *Prereq.* PTH 1330, PTH 1335, PTH 1340, PTH 1345, PTH 1360, and PTH 1366.

PTH 1400 Administration**4 QH**

Explores concepts in administration and management applied to physical therapy. Involves seminar and discussion groups. *Prereq.* PTH 1380.

PTH 1405 Research for Physical Therapy**4 QH**

Covers introduction to research design, basic statistics, analysis of scientific and medical literature, and preparation of an independent research proposal. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1411 Physical Therapy 8**4 QH**

Incorporates analysis and comparison of methods of physical therapy evaluation and treatment, with an emphasis on therapeutic exercise. Focuses on treatment planning for various problems, with emphasis

on rationale and selection of treatment alternatives. Uses case study format and case simulations. Meets for three lecture hours, with the third hour in seminar format with small-group discussions. *Prereq.* *Satisfactory attainment in all prior professional courses.*

PTH 1415 Supervised Clinical Education 2 0 QH

Provides advanced clinical education by giving the student further opportunities to practice various phases of physical therapy under supervision in preparation for assuming the role of a qualified physical therapist. Involves assignments in Massachusetts and other states, and twelve weeks during senior year. Required for graduation from the physical therapy program. *Prereq.* *Satisfactory attainment in all prior professional courses.*

PTH 1420 Physical Therapy in the Health Care System 3 QH

Examines major issues affecting the delivery of health care. Emphasizes the role of the physical therapist as a member of the health team. Involves class discussion and seminar. *Prereq.* *PTH 1370 and PTH 1380.*

PTH 1426 Functional Assessment of the Elderly Client 3 QH

Discusses the interaction of psychological, social and physiological factors and their effects on the potential for function of the elderly client. Studies and designs assessment instruments. *Prereq.* *PTH 1370 and PTH 1380.*

PTH 1450 Investigative Studies 6 QH

Covers selected modules related to current practice in physical therapy; completion of research project on a volitional basis. *Prereq.* *Satisfactory attainment in all prior professional courses.*

PTH 1702 Special Topics in Physical Therapy 2 QH

Offers innovative methods of instruction and deals with areas of special interest.

PTH 1704 Special Topics in Physical Therapy 4 QH

Offers innovative methods of instruction and deals with areas of special interest.

PTH 1777 Honors Adjunct 1 QH

Constitutes an addition to any three, four-, five-, or six-quarter-hour course in the department when approved by the honors committee of Boston-Bouvé. Once approved, the adjunct information is forwarded to the honors membership by the honors office. Allows students to enroll an unlimited number of times as an adjunct to any physical therapy course.

PTH 1800 Directed Study 2 QH

Provides experience for the student whose unique academic needs or interests cannot be adequately satisfied in the basic, entry-level curriculum of the Department of Physical Therapy. *Prereq.* *Permission of instructor, chair, and dean.*

Speech-Language Pathology and Audiology

SLA 1101 Introduction to Speech and Hearing 4 QH

Offers an overview of disorders of speech and hearing and their treatment, and a review of normal speech and hearing development. Requires clinical observations of persons with speech, language, and hearing disorders.

SLA 1200 Hearing Science 4 QH

Presents basic concepts related to the physics of sound, followed by an in-depth study of the anatomy and physiology of the normal hearing mechanism. In addition, discusses basic principles of psychophysics of audition. *Prereq.* *SLA 1101.*

SLA 1201 Anatomy and Physiology of Vocal Mechanisms 4 QH

Offers an in-depth study of the static structure, musculature, and physiology of the speech mechanism. Emphasizes current research in speech physiology. *Prereq.* *SLA 1101.*

SLA 1300 Developmental Semantics and Syntax 4 QH

Analyzes the emerging semantic and syntactical aspects of language in normal and atypical children. Discusses current theory and research in language acquisition. Requires clinical observations of children with normal and atypical language patterns. *Prereq.* *SLA 1101.*

SLA 1301 Phonetics and Developmental Phonology 4 QH

Offers basic training in auditory recognition and symbolization of phonemes and allophones in major American dialects. Stresses static and dynamic articulatory descriptions. Also includes a review of the developmental sequence of phonemic acquisition. *Prereq.* *SLA 1101 and SLA 1201.*

SLA 1302 Phonemic Disorders 4 QH

Provides a practical and theoretical examination of the phonemic disorders and their etiology; also examines diagnostic tools for evaluation and methods of treatment. Requires clinical observations of persons with phonemic disorders. *Prereq.* *SLA 1201, SLA 1300, and SLA 1301.*

SLA 1303 Introduction to Audiology 4 QH

Focuses on the basic techniques of audiometric testing and hearing conservation, including a review of basic hearing sciences and a prepracticum and laboratory experience in hearing testing. *Prereq.* *SLA 1200.*

SLA 1400 Speech Science 4 QH

Examines the basic sciences involved in speech and audition, including in-depth study of the analysis of sound and the acoustic composition of speech.

Emphasizes a review of current theory and research in speech reception, perception, and production. *Prereq.* SLA 1101 and SLA 1200.

SLA 1401 Fluency Disorders

4 QH

Offers a comprehensive study of the various theories and symptomatology of stuttering from the earliest historical references through the nineteenth and twentieth centuries. Requires clinical observations. *Prereq.* SLA 1201.

SLA 1800 Directed Study

4 QH

Provides study for the student whose unique academic needs or interests cannot adequately be

satisfied in any of the scheduled courses of the department. Requires approval of the supervising faculty member, the chairperson, and the Office of the Dean of the Boston-Bouvé College of Human Development Professions. Also requires that approval forms be submitted to the dean's office during the quarter prior to registration for the directed study. *Prereq.* *Permission of instructor.*

Pharmacy

PAH 1135 Professional Dynamics in the Health Care Delivery System

4 QH

Examines the evolution of the American health care delivery system, with emphasis on current aspects of how health care is delivered, how it is financed, where it is delivered, and who delivers it. Discusses present and future influences in health, including health promotion, disease prevention, and environmental issues. Considers unique and collective health professional roles and responsibilities, humanistic/behavioral dimensions of health care, professional organizations, and professionalism.

PAH 1202 Anatomy-Physiology 1

5 QH

Covers structure and function of cells, tissues, and organs, including the muscular, immune, and nervous systems. Includes human skeletal anatomy and cat dissection. Oriented to students in the health professions. Lab fee. *Prereq.* CHM 1122 or CHM 1102 and BIO 1107.

PAH 1204 Anatomy-Physiology 2

5 QH

Covers structure and function of the various life-supportive systems not covered in the first quarter: cardiovascular, endocrine, gastrointestinal, and pulmonary systems. Emphasizes in the lab the basic principles involved in understanding the functioning life systems and cell function. Lab fee. *Prereq.* PAH 1202 or permission of instructor.

PAH 1210 Anatomy-Physiology 1

4 QH

Offers students the opportunity to take the lecture portion only of PAH 1202. *Prereq.* *Permission of instructor.*

PAH 1211 Anatomy-Physiology Laboratory 1

1 QH

Offers students the opportunity to take the lab portion only of PAH 1202. *Prereq.* *Permission of instructor.*

PAH 1212 Anatomy-Physiology 2

4 QH

Offers students the opportunity to take the lecture portion only of PAH 1204. *Prereq.* *Permission of instructor.*

PAH 1213 Anatomy-Physiology Laboratory 2

1 QH

Offers students the opportunity to take the lab portion only of PAH 1204. *Prereq.* *Permission of instructor.*

PAH 1280 Biochemistry

5 QH

Introduces the structures, functions, and metabolism of amino acids, proteins, carbohydrates, lipids, and nucleic acids. Discusses the mechanisms of enzyme reactions, enzyme kinetics, vitamins, biological oxidation reduction reactions, and bioenergetics, as well as various inborn errors of metabolism.

PAH 1776 Junior/Senior Honors Thesis

4 QH

Provides students with the opportunity to become involved with faculty on either ongoing research projects or student-initiated scholarly activities. Encourages and assists students in writing, presenting, and publishing their research. Allows students to gain an awareness and some understanding of a discipline or area of study in the allied health professions while developing an appreciation for research methods and the process of scientific inquiry. Requires submission of a junior/senior thesis. *Prereq.* *Honors participation.*

PAH 1777 Honors Directed Study

1 QH

Designed to be attached to a predesignated professional course in the student's major and offered at the discretion of the faculty member(s) teaching the course. For further details, contact the honors office (215LA) or PAH honors advisor. *Prereq.* *Honors participation, permission of instructor.*

PCL 1101 Drugs—Their Uses and Actions

4 QH

Studies background, classification, dose responses, untoward side effects, uses, and commercial preparations of a broad series of drugs. *Not open to pharmacy, respiratory therapy, or nursing majors.*

PCL 1301 Basic Pharmacology

3 QH

Provides students an opportunity to learn the classification, mechanisms of action, and uses of a broad spectrum of therapeutic agents. Emphasizes dose response and untoward side effects. *Prereq.* *Permission of instructor.*

PCL 1305 Pharmacodynamics

3 QH

Introduces pharmacologic principles, with the pharmacotherapeutics of drug groups and individual drug substances of particular importance in treatment and diagnosis of disease. *Prereq.* BIO 1120, BIO 1255, CHM 1111, and CHM 1112.

PCL 1309 Pharmacology for the Respiratory-Care Practitioner 4 QH

Provides an orientation to pharmacology, including the scope of pharmacology; definitions; drug standards; drug legislation; names, sources, and active constituents; and pharmaceutical preparations of drugs relating to the respiratory-care practitioner.

PCL 1410 Introduction to Pathology 4 QH

Focuses on basic concepts of pathology for the pharmacy, toxicology, and respiratory therapy majors, with emphasis on disease processes and alterations of normal biochemical mechanisms. *Prereq.* PAH 1202 and PAH 1204.

PCL 1419 Pharmacology/Medicinal Chemistry 1 5 QH

Introduces the principles of pharmacology and medicinal chemistry. Discusses major drug classes affecting the central nervous system, including anxiolytics, sedative-hypnotics, anesthetics, anticonvulsants, neuroleptics, antidepressants, and narcotic analgesics. Considers therapeutic indications, mechanisms of action, structure-activity relations, and undesirable actions including the problems of drug abuse. *Prereq.* BIO 1107, CHM 1265, PAH 1202, and PAH 1204.

PCL 1420 Pharmacology/Medicinal Chemistry 2 6 QH

Continues discussion of topics introduced in PMC 1419. Presents an interdisciplinary chemical and pharmacological approach to understanding drug action. Deals principally with drugs affecting the peripheral nervous, cardiovascular, and renal systems. *Prereq.* PMC 1419.

PCL 1422 Pharmacology/Medicinal Chemistry 3 6 QH

Continues discussion of topics in PCL 1420. Covers the medicinal chemistry and pharmacology of drugs acting on the gastrointestinal, endocrine, reproductive, and hematopoietic systems, along with autocoid and antineoplastics. *Prereq.* PCL 1420.

PCL 1451 Pharmacology Laboratory 1 QH

Provides experience in systematically monitoring the qualitative effects of selected drugs from major classes of drugs by a modified "Hippocratic Screen" technique. Studies basic quantitative characteristics of drug dose-response relationships, factors influencing such relationships, and general methods of calculating and reporting such data. Lab fee. *Prereq.* PMC 1418.

PCL 1801, PCL 1802, PCL 1803 Special Research Project (Pharmacology) 4 QH each

Provides opportunity for directed study or research in pharmacology/toxicology wherein the student may undertake in-depth investigation of an area of specialized interest. Lab fee. *Prereq.* Permission of instructor and program director.

PCT 1230 Pharmaceutical Calculations 3 QH

Introduces the general scope of pharmacy. Emphasizes systems of measurement and basic arithmetic calculations as they relate to the practice of pharmacy. In addition, introduces the student to statistical analysis and essential mathematical concepts required for subsequent courses in pharmaceuticals.

PCT 1240 Pharmaceutical Calculations 4 QH

Introduces the application of mathematical concepts in pharmacy. Emphasizes systems of measurement and basic arithmetic calculations as they relate to the practice of pharmacy. Also introduces statistical analysis methods required for subsequent courses in pharmaceuticals and for improving problem-solving skills using computers.

PCT 1310 Pharmaceutics Laboratory 1 1 QH

Focuses on the physicochemical principles of pharmaceutical preparations and their relationship to quality control and biopharmaceutics and pharmacokinetics. *Prereq.* PCT 1340 or concurrent enrollment.

PCT 1320 Pharmaceutics Laboratory 2 2 QH

Focuses on the application of the fundamental principles and techniques of pharmaceutics to the lab preparation and use of various pharmaceutical products. *Prereq.* PCT 1350 or concurrent enrollment.

PCT 1340 Pharmaceutics 1 4 QH

Focuses on the study of physiochemical theories and principles and their application to pharmaceutical systems. Covers thermodynamics, ionic equilibria, solubility, complexation, interfacial phenomena, rheology, coarse dispersions, diffusion, membrane transport, and kinetics. *Prereq.* MTH 1108, PHY 1203, CHM 1265, and PCT 1230.

PCT 1350 Pharmaceutics 2 5 QH

Focuses on the application of the fundamental principles of physical pharmacy to the formulation of pharmaceutical preparations. Emphasizes pharmaceutical dosage forms, including both industrial formulation and extemporaneous compounding. *Prereq.* PCT 1340.

PCT 1440 Biopharmaceutics/ Pharmacokinetics 4 QH

Acquaints students with biopharmaceutics and basic pharmacokinetics. Discusses dissolution, disintegration, general concept of one- and two-compartment models; linear and nonlinear pharmacokinetics; drug kinetics after intravenous, intramuscular, or oral administration; practical methods of one-compartment model utilizing urinary data; bioavailability; multiple-dosing kinetics; and general approaches to dosage adjustment in disease states. *Prereq.* PAH 1204 and PCT 1340.

PCT 1441 Pharmacokinetic Principles in Drug Therapy 4 QH

Covers the monitoring, development, and modification of drug dosage regimens and the pharmacokinetic factors influencing the selection of these regimens for the various therapeutic categories of drugs. Also studies decision-analytic principles applied to serum-level test characteristics and other decisions made in therapeutic-drug monitoring. *Prereq.* PCT 1440.

PCT 1801, PCT 1802, PCT 1803 Pharmaceutics Special Research Project 4 QH each

Provides opportunity for directed study or research in one of the pharmaceutical sciences, wherein the student may undertake in-depth investigation of an

area of specialized interest. Lab fee. *Prereq.* *Permission of instructor(s) and program director.*

PHP 1301 Pharmaceutical Jurisprudence 4 QH
Offers a comprehensive analysis and interpretation of laws relating to the practice of pharmacy. Discusses federal and state food and drug laws, narcotics laws, Medicare and Medicaid regulations, and state pharmacy laws. *Prereq.* *Permission of instructor.*

PHP 1302 Pharmacy Administration 1 4 QH
Covers socioeconomic aspects of pharmacy: the government's relation to the pharmaceutical industry, trends in contemporary practice, third-party payment plans, macroeconomic impact on the industry, and the interaction of current concepts in pharmacy. *Prereq.* *Permission of instructor.*

PHP 1303 Interpersonal Skills for Health Professionals 4 QH

Applies the skills of interpersonal communication to situations encountered in various health care settings. Provides students with an opportunity to learn to integrate specific technical competence with serious concern for personal, social, and cultural factors in illness and health care. Through the use of medical sociology literature, audio-visual materials, case analyses, and personal reflection on actual patient encounters, provides the students with an opportunity to improve interpersonal communication skills and to increase their understanding of practitioner-patient relationships, patient's needs and responses in illness and treatment, and professional behavior in practice settings.

PHP 1304 Social Pharmacology 4 QH
Studies drug-taking experiences and behaviors. Provides an overview of theories and research findings that describe the relationships between personal, social, and cultural factors and drug taking, while comparing and contrasting the social approach with the pharmacological paradigm of drug effects and the medical model of drug use. Through readings, audiovisual materials, and descriptions of personal experiences, examines the varieties of drug experiences, patterns of and reasons for drug taking of all types, and strategies for preventing drug-use problems. *Prereq.* *PHP 1303 or consent of instructor.*

PHP 1305 Hospital Pharmacy Management 4 QH
Examines the factors involved in the operations and management of a hospital pharmacy within the context of the total hospital structure. *Prereq.* *Senior standing or permission of instructor.*

PHP 1306 Community Pharmacy Management 4 QH
Focuses on the management requirements for establishing a community pharmacy. Analyzes the prevailing types of organizations, locations, leases, business organization, staffing, plant layout and design, and financial factors. *Prereq.* *Senior standing or permission of instructor.*

PHP 1307 Principles of Management 4 QH
Covers the fundamentals of business organization, with emphasis on the qualitative and legal aspects of

management. Includes an analysis of the marketing structure of the drug trade, forces of organizations, personnel management, and decision-making theory using nonqualitative data. *Prereq.* *Permission of instructor.*

PHP 1308 Financial Management 4 QH
Examines the fundamentals of accounting and finance, with emphasis on their application to retailing and community pharmacy management. Covers accounting systems, analysis of financial statements, budgets, cash flow, taxation, and finance in depth. *Prereq.* *Permission of instructor.*

PHP 1309 Seminar in Community Pharmacy Management 4 QH
A discussion course on all phases of community pharmacy operations with extensive utilization of the case method of instruction. *Prereq.* *Permission of instructor.*

PHP 1401 Drug Information and Evaluation 3 QH
Introduces the principles and practice of drug information. Covers the levels of practice, the availability of therapeutic reference sources, the use of abstracting and indexing systems, how to respond to drug information questions, and basic statistical data required to help understand the medical and pharmaceutical literature. *Prereq.* *Fifth-year standing or permission of instructor.*

PHP 1402 Parapharmaceuticals 2 QH
Focuses on the nature and application of various surgical devices, appliances, bandages, and hospital and sickroom supplies in patient care.

PHP 1501 Pharmacy Externship 4 QH
Involves a 520-hour (13 weeks x 40 hours/week) structured practicum in community pharmacy. Includes applied aspects of community pharmacy management; medication dispensing; and patient-oriented services such as prescription and nonprescription medication, consultation, and patient-profile monitoring. *Prereq.* *Fifth-year standing.*

PHP 1502 Clinical Pharmacy Clerkship 15 QH
Involves assignment to a clinical site for five full days per week to observe patient response to medication and to evaluate and advise on all factors that may modify efficacy, safety, and economy of therapy. Offers campus seminar with student presentations on current therapeutic topics. *Prereq.* *PHP 1602.*

PHP 1503 Professional Practice Laboratory 1 QH
Focuses on compounding and dispensing medications. Emphasizes patient counseling techniques and monitoring for appropriateness of therapy. Examines prescription compounding and screening for incompatibilities. Also includes an introduction to the preparation of intravenous solutions. *Prereq.* *Senior standing or permission of instructor.*

PHP 1601 Nonprescription Medication 4 QH
Provides an overview of the types of over-the-counter medications. Discusses the directions and precautions for proper use of these preparations.

PHP 1602 Pharmacotherapeutics**5 QH**

Discusses common clinical lab tests, major disease states, and drug therapy for those conditions. *Prereq.* PCL 1422 and PCL 1410.

PHP 1603 Selected Topics in Clinical Pharmacy 1**4 QH**

Helps students increase their understanding of selected diseases. Examines pathophysiology and diagnosis of the illness as well as drug therapy and its relation to patient compliance and education. Provides greater depth than existing clinical pharmacy courses. *Prereq.* PHP 1602 and permission of instructor.

PHP 1604 Selected Topics in Clinical Pharmacy 2**4 QH**

Helps increase the student's knowledge of selected disease entities. Examines pathophysiology and diagnosis of the illness as well as drug therapy and its relation to patient compliance and education. Provides greater depth than existing clinical pharmacy courses. *Prereq.* PHP 1602 and permission of instructor.

PHP 1605 Introduction to Sterile Products**4 QH**

Introduces pharmacists' role in the manufacture and clinical use of sterile products. Covers IV incompatibilities, aseptic technique, sterile room equipment, quality control, safe handling of cancer chemotherapeutic agents, and sterile product room systems and design. Discusses a variety of sterile products, including parenteral nutrition, small and large volume parenterals, irrigating solutions, cancer chemotherapeutic agents, and ophthalmic preparations. Emphasizes developing an ability to interact with other health professionals with regard to the clinical use of sterile products. Offers an opportunity to use lab equipment to prepare sterile products based on the concepts discussed in class. *Prereq.* Fourth- or fifth-year pharmacy major only.

PHP 1607 Cancer Chemotherapeutics**4 QH**

Emphasizes the role of chemotherapy in the management of malignant disease. Discusses clinical applications of specific chemotherapeutic agents, with the remainder of the course concentrating on specific disease states. Covers related topics such as pain control in cancer patients, control of nausea and vomiting, principles of cancer research, cancer quackery, and adverse effects of chemotherapy. *Prereq.* Fourth-year pharmacy major or permission of instructor.

PHP 1801, PHP 1802, PHP 1803, PHP 1804**4 QH each****Special Research Project**

Provides opportunity for directed study or research in clinical pharmacy or pharmacy administration,

wherein the student may undertake in-depth investigation of an area of specialized interest. *Prereq.* Permission of instructor.

PHP 1805 Special Research Project**3 QH**

Offers directed study or research in pharmacy administration, allowing for the in-depth investigation of an area of special interest. *Prereq.* Permission of instructor.

PHP 1806 Special Research Project**2 QH**

Same as PHP 1805.

PMC 1321 Pharmaceutical Analysis and Quality Control**4 QH**

Introduces the methods of pharmaceutical analysis and quality control. Reviews analytical methods—such as chromatography, titration, and spectroscopy—and how they are applied to the evaluation of pharmaceutical products and dosage forms. *Prereq.* HM 1265.

PMC 1419 Medicinal Chemistry/Pharmacology 1**5 QH**

Introduces the principles of pharmacology and medicinal chemistry. Discusses the major drug classes affecting the central nervous system, including anxiolytics, sedative-hypnotics, anesthetics, anticonvulsants, neuroleptics, antidepressants, and narcotic analgesics. Considers therapeutic indications, mechanisms of action, structure-activity relations, and undesirable actions including drug abuse. *Prereq.* BIO 1107, CHM 1265, PAH 1202, and PAH 1204.

PMC 1420 Antiinfectives**5 QH**

Focuses on the use of drugs in the treatment of infectious disease. Includes an introduction to microbiology as it relates to the practice of pharmacy, a survey of the structures and mechanisms of actions of chemotherapeutic agents, and a review of the clinical applications of those drugs. *Prereq.* PMC 1418, PCL 1420, and PAH 1280.

PMC 1801, PMC 1802, PMC 1803 Special Research Project (Medicinal Chemistry)**4 QH each**

Offers directed study or research in one of the medicinal chemistry areas, wherein students may undertake in-depth investigation of an area of specialized interest. Lab fee. *Prereq.* Permission of instructor and program director.

Health Professions

General Courses

HRA 1310 Hospital Law 2 QH
Analyzes the legal principles relating to medical and paramedical practice within a hospital environment. Discusses the common law and statutory rights of the hospital, practitioner, and patient.

HRA 1320 Language of Medicine 4 QH
Studies the language of medicine, including prefixes, suffixes, roots, abbreviations, and disease, operative, and drug terms. Also includes terms related to all area specialties. Studies the terms as they relate to a specific system of the body.

HRA 1321 Language of Health Professionals 2 QH
Studies the language of medicine and health care. Emphasizes disease, procedures, and symptomatic terms and their definitions, word construction, analysis, and application. Provides the student with an opportunity to acquire knowledge of medical terminology.

HRA 1330 Foundations of Medical Science 1 3 QH
Examines the diseases most commonly encountered in the hospital, the clinic, and the home. Emphasizes disease processes that affect the body as a whole, including inflammation, immune process, infection, genetic disease, benign and malignant abnormal growth, mental illness, blood and lymph disorders, and central nervous system disease.

HRA 1340 Foundations of Medical Science 2 3 QH
Examines the diseases most commonly encountered in the hospital, the clinic, and the home. Emphasizes disease processes that affect the body systems, including the coronary, respiratory, gastrointestinal, kidney, reproductive, hepatic, and musculoskeletal systems. *Prereq.* HRA 1330.

Toxicology

TOX 1100 Toxicology Orientation 1 QH
Introduces toxicology as it relates to regulatory, environmental, forensic, and clinical issues. Focuses on general principles of toxicology and their application to determining the hazards of toxicants in the workplace, the home, and the environment.

Tox 1101 Current Topics in Toxicology 1 QH
Discusses topics of interest to toxicology, pharmacy, biology, chemistry, nursing, and related majors. Selects topics from current research that span regulatory, public health, and environmental issues. Explores other toxicology-related topics.

TOX 1131 Laboratory Animal Science 4 QH
Presents a comprehensive examination of the role of the lab animal in biomedical research. Includes historical and legislative aspects of animal research, basic anatomy and physiology, genetics and nutrition, physiological parameters, animal health and disease, and experimental protocols. *Prereq.* BIO 1260, PAH 1204, and/or permission of instructor.

TOX 1300 Clinical Toxicology 4 QH
Examines the potential toxicity of drugs, commercial products, and environmental agents. Focuses on clinical manifestations, mechanisms of toxicity, principles of treatment, and prevention of acute and chronic poisonings. *Prereq.* PMC 1418.

TOX 1301 Fundamental Principles of Systemic Toxicology 4 QH
Presents the principles of toxicology from an organ-system perspective. Focuses on the basic concepts used to evaluate toxicity, the mode of injury at the organ and cellular levels, and the basic subcellular

mechanisms through which toxic agents produce damaging effects. Uses recent toxicological literature to introduce the concepts needed to evaluate toxicity through the analysis of data. *Prereq.* PMC 1418.

TOX 1302 Chemical and Analytical Toxicology 4 QH
Continues TOX 1301. Places additional emphasis on the interpretation of the toxicological literature to evaluate the risk involved from exposure to prototype chemicals. Uses structure activity and biochemical methods of assessment to evaluate the toxicity of major classes of chemical compounds. *Prereq.* PMC 1418 and TOX 1301.

TOX 1322 Biochemical Toxicology Laboratory 4 QH
Introduces the student to investigational methods for assessing toxicity; helps develop the student's ability to analyze and interpret data generated in the lab and in the literature; and helps the student develop technical report-writing skills. Uses rodents as a model for toxic insult. Examines hepatotoxicity, neurotoxicity, teratogenicity, and other toxic manifestations at the whole-animal, whole-tissue, and biochemical levels. *Prereq.* TOX 1300, TOX 1301, or TOX 1302.

TOX 1801, TOX 1802, TOX 1803 Special Topics 4 QH each
Selected areas of toxicology will be explored. These may include research, seminars, comparative analysis of data, or faculty-guided programs.

Medical Laboratory Science

The medical laboratory professional courses are taught by University faculty and supportive clinical faculty.

MLS 1101 Medical Laboratory Science Orientation 1 1 QH

Focuses on the history and development of the medical lab science profession; includes an introduction to medical terminology.

MLS 1102 Medical Laboratory Science Orientation 2 1 QH

Continues discussion of topics introduced in MLS 1101, with the addition of a review of mathematics and metric-unit calculations.

MLS 1109 Foundations of Clinical Laboratory Science 4 QH

Examines basic lab methods employed in primary care, including urinalysis, gram staining, hematocrit, hemoglobin, sedimentation rate, white cell count, and differential. *Prereq.* Admission to physician assistant program or permission by instructor.

MLS 1111 Basic Medical Laboratory Science Urinalysis 3 QH

Surveys basic medical lab science. Covers principles and theories of renal physiology, with lab emphasis on techniques for chemical and microscopic detection of normal and abnormal constituents. Lab fee. *Prereq.* BIO 1107 and CHM 1122.

MLS 1123 Basic Hematology 1 2 QH

Introduces hematology procedures and principles; hemoglobin, hematocrit, white and red blood cell counts; and white cell differentiation. Replaces lecture portion of MLS 1121. *Prereq.* BIO 1107 and CHM 1122.

MLS 1124 Basic Hematology 2 2 QH

Studies the principles and procedures of hematology, emphasizing hematologic cell maturation, morphology, and basic hemostasis. Replaces lecture portion of MLS 1122. *Prereq.* MLS 1123 or MLS 1321.

MLS 1132 Basic Immunohematology 3 QH

Teaches the principles of immunohematology with specific application to the ABO and Rh blood group system, antibody detection, and crossmatch design. Studies basic blood bank techniques including blood typing and crossmatching. Replaces immunohematology lecture portion of MLS 1131. *Prereq.* BIO 1107, MLS 1171 and MLS 1271.

MLS 1141 Basic Medical Laboratory Science Clinical Microbiology 6 QH

Focuses on basic principles and techniques of organism isolation, cultivation, and identification from clinical specimens. Discusses elementary serologic procedures. Lab fee. *Prereq.* CHM 1122 and BIO 1107.

MLS 1142 Basic Clinical Microbiology 1 3 QH

Introduces the principles and techniques of organism isolation, cultivation, and identification from clinical specimens. Replaces lecture portion of MLS 1141. *Prereq.* BIO 1107, CHM 1122, MLS 1171, and MLS 1271.

MLS 1152 Basic Clinical Chemistry and Instrumentation 4 QH

Covers the principles of clinical chemistry with application to procedures and techniques. In laboratory work, emphasizes the clinical significance and common methods of quantitating selected important analyses. Replaces lecture portion of MLS 1151. *Prereq.* CHM 1122 and MLS 1112 or MLS 1311.

MLS 1171 Basic Immunology 1 QH

Covers the concepts of medical immunology, including the relationship between disease, immune response, and laboratory procedures. Encompasses the concepts of antigen and antibody structure and relationship, specific and nonspecific host response, and common laboratory methods for detecting antibodies and antigens. Includes material previously presented as part of MLS 1131.

MLS 1223 Basic Hematology 1 Lab 1 QH

Laboratory for MLS 1123.

MLS 1224 Basic Hematology 2 Lab 1 QH

Laboratory for MLS 1124.

MLS 1232 Basic Immunohematology Lab 1 QH

Laboratory for MLS 1132.

MLS 1242 Basic Clinical Microbiology 1 Lab 1 QH

Laboratory for MLS 1142.

MLS 1252 Basic Clinical Chemistry and Instrumentation Lab 1 QH

Laboratory for MLS 1152.

MLS 1271 Basic Immunology Lab 1 QH

Laboratory for MLS 1171.

MLS 1311 Basic Medical Laboratory Science Urinalysis 2 QH

Introduces basic medical laboratory science. Examines principles and theories of renal physiology, with laboratory emphasis on techniques for chemical and microscopic detection of normal and abnormal urinary tract constituents. Lab fee. *Prereq.* CHM 1122 and BIO 1107.

MLS 1321 Basic MLS Hematology 1 2 QH

Introduces basic hematology procedures and principles, including hemoglobin, hematocrit, white and red blood cell counts, and white cell differentiation. Lab fee. *Prereq.* CHM 1122 and BIO 1107.

MLS 1322 Basic MLS Hematology 2 2 QH

Covers principles and procedures of basic medical lab hematology, including basic hemostasis. Lab fee. *Prereq.* MLS 1121 or MLS 1321.

MLS 1323 Advanced Hemostasis Techniques 2 QH

Focuses on advanced hemostatic techniques. Stresses theory and methodology, along with interpretation of lab results. Lab fee. *Prereq.* MLS 1122, MLS 1322, or permission of instructor.

MLS 1324 Histochemistry**2 QH**

Covers the histochemistry of hemic cells and techniques used in diagnosis of hematological disorders. Lab fee. *Prereq.* *MLS 1621, MLS 4341, or permission of instructor.*

MLS 1330 Basic MLS Immunohematology**2 QH**

Covers basic principles in immunohematology and related techniques, with particular emphasis on those procedures used in blood banking. Lab fee. *Prereq.* *BIO 1107.*

MLS 1331 Basic MLS Clinical Immunology**3 QH**

Covers basic principles of immunology, with laboratory emphasis on immunodiagnostic techniques currently used in clinical lab practice. Lab fee. *Prereq.* *BIO 1107 and CHM 1122.*

MLS 1333 Immunohematology**2 QH**

Offers advanced studies in antigen-antibody detection and problem solving through immunohematological tests. Discusses related hematologic disorders and the medical/legal aspects of blood banking. Lab fee. *Prereq.* *MLS 1131; or MLS 1330 and MLS 1331.*

MLS 1341 Basic MLS Clinical Microbiology**4 QH**

Covers basic principles and techniques of organism isolation, cultivation, and identification from clinical specimens. Discusses elementary serologic procedures. Lab fee. *Prereq.* *BIO 1107 and CHM 1122.*

MLS 1351 Basic Medical Laboratory Science Clinical Chemistry and Instrumentation**4 QH**

Examines principles, procedures, and techniques of basic clinical chemistry and instrumentation, with lab emphasis on instrumental analysis of clinical specimens. Lab fee. *Prereq.* *CHM 1221; MLS 1111 or MLS 1311.*

MLS 1412 MLT Special Topics—Applied Microscopy**2 QH**

Offers clinical practicum in applied urinalysis, parasitology, and mycology at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)-level instruction. *Prereq.* *Admission to MLT Clinical Program.*

MLS 1423 MLT Applied Study in Hematology**2 QH**

Offers clinical practicum in hematology and coagulation at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)-level instruction. *Prereq.* *Admission to MLT Clinical Program.*

MLS 1432 MLT Applied Study in Blood Banking**2 QH**

Offers clinical practicum in blood banking at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)-level instruction. *Prereq.* *Admission to MLT Clinical Program.*

MLS 1442 MLT Applied Study in Clinical Microbiology**2 QH**

Offers clinical practicum in microbiology at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)-level instruction. *Prereq.* *Admission to MLT Clinical Program.*

MLS 1452 MLT Applied Study in Clinical Chemistry**2 QH**

Offers clinical practicum in clinical chemistry at an affiliated hospital providing MLT(ASCP)- and

CLT(NCA)-level instruction. *Prereq.* *Admission to MLT Clinical Program.*

MLS 1480 MLT Seminar 1**2 QH**

Offers a basic introduction to correlation of laboratory findings in hematology, blood banking, microbiology, and clinical chemistry, with appropriate referrals of lab information in working situation. Examines basic use of quality control. *Prereq.* *Admission to MLT Clinical Program.*

MLS 1523 Hematology MT Applied Study**4 QH**

Offers clinical practicum in applied hematology at an affiliated hospital providing for MT(ASCP)- and CLS(NCA)-level instruction. *Prereq.* *Admission to MT Clinical Program.*

MLS 1532 Immunohematology MT Applied Study**3 QH**

Offers clinical practicum in applied immunohematology at an affiliated hospital providing MT(ASCP)- and CLS(NCA)-level instruction. *Prereq.* *Admission to MT Clinical Program.*

MLS 1544 Clinical Microbiology MT Applied Study**7 QH**

Offers clinical practicum in applied microbiology at an affiliated hospital providing MT(ASCP)- and CLS(NCA)-level instruction. *Prereq.* *Admission to MT Clinical Program.*

MLS 1552 Clinical Chemistry MT Applied Study**7 QH**

Offers clinical practicum in applied clinical chemistry at an affiliated hospital providing MT(ASCP)- and CLS(NCA)-level instruction. *Prereq.* *Admission to MT Clinical Program.*

MLS 1573 Clinical Immunology MT Applied Study 1**1 QH**

Offers clinical practicum in applied clinical immunology at an affiliated hospital providing MT(ASCP) and CLS(NCA)-level instruction. *Prereq.* *Admission to MT Clinical Program.*

MLS 1574 Clinical Immunology MT Applied Study 2**1 QH**

Continues MLS 1573.

MLS 1621 Advanced Hematology 1**3 QH**

Studies physiology of blood cells and bone marrow; reviews physiology of blood hemopoiesis; discusses hematologic results as they relate to normal, anemic, and leukemic conditions. *Prereq.* *MLS 1124 or permission of instructor.*

MLS 1622 Advanced Hematology 2—Hemostasis**2 QH**

Offers advanced studies in hemostasis, with emphasis on factor identification and problem solving of hemostatic problems. *Prereq.* *MLS 1124 or permission of instructor.*

MLS 1631 Advanced Immunohematology**2 QH**

Examines blood group systems, antibody identification, and advanced immunohematologic principles and procedures. Presents case studies. *Prereq.* *MLS 1332 or MLS 1132.*

MLS 1642 Medical Parasitology**3 QH**

Focuses on lab identification of significant human parasites. Examines life cycles related to mode of infestation, effects on humans, and diagnostic form. Lab fee. *Prereq.* *MLS 1141.*

MLS 1648 Advanced Clinical Microbiology**4 QH**

Examines host and microbial interactions in disease produced by viruses, rickettsia, chlamydia, mycoplasma, mycobacteria, anaerobic bacteria, and actinomyces. Also covers host and microbial interactions in gastrointestinal, genitourinary, and respiratory tract infections. Discusses disease states, diagnostic procedures, and antimicrobial testing. Combines MLS 1645 and MLS 1646. *Prereq.* *MLS 1142 and MLS 1143.*

MLS 1654 Advanced Clinical Chemistry 1**4 QH**

Includes current methodologies and instrumentation used in clinical chemistry to evaluate hormonal conditions, drug level monitoring, amino acids, proteins, enzymes, and carbohydrates. Combines content included in MLS 1651 and MLS 1652. *Prereq.* *MLS 1152, MLS 1351, or permission of the instructor.*

MLS 1655 Advanced Clinical Chemistry 2**4 QH**

Studies metabolism and procedures for nucleic acids, lipids, acid-base balance, hepatic, renal and gastrointestinal systems, as well as vitamin and trace metal blood levels. Combines content included in MLS 1652 and MLS 1653. *Prereq.* *MLS 1654 or permission of instructor.*

MLS 1661 Medical Laboratory Science Education**2 QH**

Surveys current topics in medical lab science education: developing objectives, methods of evaluation and certification, clinical instruction and evaluation, medical lab science curricula, and use of media and other methods of instruction. *Prereq.* *Completion of clinical program.*

MLS 1665 Medical Laboratory Management**2 QH**

Surveys factors that relate to effective lab administration: hospital organizational structure, principles of management and supervision, cost accounting, purchasing, inspection guidelines, legal responsibilities, and personnel relations. *Prereq.* *Completion of clinical program.*

MLS 1672 Immunopathology**3 QH**

Covers the situations in which the host defense response produces the symptoms of disease. Discusses conditions that result from immunodeficiency. Explains the role of the immune system in transplant rejection. Describes neoplasms of the immune system and discusses laboratory procedures used in the diagnosis and management of these conditions. *Prereq.* *MLS 1171.*

MLS 1680 MLS Special Topics**2 QH**

Discusses current topics in the clinical lab. *Prereq.* *MLS 1111, MLS 1121, MLS 1122, MLS 1131, MLS 1141, and MLS 1151.*

MLS 1681 MLS Senior Seminar**2 QH**

Reviews current undergraduate medical lab science topics.

MLS 1890 Undergraduate Research**2 QH**

Examines special problems in lab medicine involving individual research under the direction of a faculty member. *Prereq.* *Special permission.*

MLS 1891 MLS Current Concepts**1 QH**

Discusses topics determined by recent advances in medical lab science.

Health Record Administration

HRA 1100 Orientation to Medical Records 1**1 QH**

Focuses on the issues, activities, and opportunities in the medical record profession.

HRA 1410 Health Record Science 1**4 QH**

Introduces health record science, the history of medicine, and the historical development of the health-care field. Examines the medical record department, the professional medical record association, and the organization and functions of the admitting office and medical record department. Discusses definitions, standards, and development of a medical record, emphasizing its content, format, completeness, analysis, and uses. *Prereq.* *Two years of arts and sciences.*

HRA 1420 Health Record Science 2**4 QH**

Focuses on the organization of hospitals and the medical staff, accreditation and regulation of health-care facilities, principles of law related to patient care and medical records, and security and preservation of records and hospital statistics. *Prereq.* *HRA 1410.*

HRA 1430 Health Record Science 3**4 QH**

Studies in depth the standardized nomenclature of diseases and operations theory and systems, em-

phasizing diagnostic and procedure coding with ICD-9-CM. Also covers health-facility compilation and uses of data indices. *Prereq.* *HRA 1420.*

HRA 1440 Advanced Health Record Science 4**4 QH**

Covers advanced aspects of health/medical record science. Focuses on the management of record systems in ambulatory, long-term, home care, and psychiatric settings. *Prereq.* *HRA 1430.*

HRA 1450 Applied Health Records Directed Practice 1**3 QH**

Offers clinical practicum in medical record science in a general hospital. *Prereq.* *HRA 1430.*

HRA 1460 Applied Health Records Directed Practice 2**2 QH**

Offers clinical practicum in medical record science in specialized health settings. *Prereq.* *HRA 1450.*

HRA 1471 Applied Health Records Science 3**3 QH**

Offers clinical practicum in health/medical records management in the health-care facility.

HRA 1510 Management of Health Record Services 1**4 QH**

Presents introduction to management in health care. Emphasizes organization and management of health

information departments in hospitals. Provides overview of management theory, systems analysis, and problem solving. Examines tools and techniques of management; organization charts, goals, and objectives; policies and procedures; work analysis. Also covers managerial behavior, Macgregor, Maslow, Hersey Blanchard, and Blake Mouton.

HRA 1520 Management of Health Record Services 2 **4 QH**

Focuses on the medical record department within the health-care setting. Examines budget and cost-control mechanisms, office ergonomics and layout, principles of forms design, and managing transcription services. Provides an opportunity to develop the technical skills necessary to plan and analyze budgets, design office layouts, and design forms. *Prereq.* HRA 1510.

HRA 1530 Management of Health Record Services 3 **4 QH**

Focuses on the medical record department within a health-care setting. Examines employee-orientation programs, training programs, in-service education, interviewing, hiring, organized labor and collective bargaining, motivating and disciplining employees, and communication skills. Provides opportunity for students to develop employee orientation and training programs and in-service presentations. Uses role playing and case studies to develop skills in interviewing, hiring, counseling, motivating, and disciplining employees. *Prereq.* HRA 1520 or permission of the instructor.

HRA 1540 Quality Assurance **4 QH**

Focuses on the role of the professional review organizations and JCAHO (Joint Commission on Accreditation of Health Care Organizations) in quality assurance and on issues and problems related to designing, implementing, and evaluating quality-assurance and risk-management programs for health-care facilities. Provides opportunities for students to gain technical skills needed to carry out all aspects of the quality-assurance audit process. Emphasizes the quality-assurance professional's role as facilitator for physicians and other health-care professionals in the quality-assurance process. *Prereq.* HRA 1320, HRA 1430, and HRA 1440, or permission of the instructor.

HRA 1560 Seminar in Health Records **2 QH**

Uses case studies and discussion to integrate the discrete skills and knowledge of the professional curriculum into a meaningful whole by analysis of real and hypothetical problems. Emphasizes coordination between the seminar and applied medical record science. *Prereq.* Senior status.

HRA 1570 The Health Record Professional: Issues and Problems **2 QH**

Provides senior health record students with information on a range of topics germane to their professional roles but that may not have been included in other professional courses. *Prereq.* Senior status.

HRA 1580 Training and Development for Health Care Professionals **2 QH**

Prepares the health-record administration student to function as an in-service educator. Covers needs assessment, teaching techniques, and evaluation methodology.

HRA 1610 Introduction to Data Processing for the Health Professions **4 QH**

Provides an introduction to computer technology and its application to health-information management. Exposes students to information analysis and processing, emphasizing file management through the use of data-base management and spreadsheet software in computer lab sessions. Addresses the use of generic software for the development of health-care applications, current applications in health facilities, future trends, and societal issues.

HRA 1620 Systems Analysis **4 QH**

Introduces systems analysis, its concepts, and techniques. Stresses special application to health-record management throughout the course. *Prereq.* HRA 1550.

HRA 1630 Introduction to Health Data Research **4 QH**

Provides an introduction to the research process and to statistical analysis of research data. Also exposes students to research studies to develop an understanding of the research process, statistical analysis of health data for research studies, and evaluation of the validity and reliability of health-related research studies.

HRA 1640 Medical Computer Applications **4 QH**

Examines computer applications and management of computer applications in health-care facilities, emphasizing health information systems related to medical records. Applies information flow in health facilities of clinical patient data to the principles of the information system life cycle, emphasizing systems analysis process applied to medical care and management medical record department. Emphasizes the role of the Registered Record Administrator (RHA) as an active team member.

HRA 1800 Independent Study **4 QH**

Gives students an opportunity to explore in depth a subject relevant to their interests. Gives them the opportunity to study a problem, present a proposal, carry out a study or a course of action, and prepare both written and oral presentations of their activities. *Prereq.* Permission of instructor.

HRA 1810 HRA 1820 Special Topics 1, 2 **2 QH**

Provides specialized study in medical records.

Respiratory Therapy

RTH 1111 Respiratory Therapy Seminar 1 1 QH
Introduces the beginning respiratory therapy student to the role of respiratory therapists in health-care delivery.

RTH 1112 Respiratory Therapy Seminar 2 1 QH
Introduces the beginning student to therapeutic modalities of respiratory care.

RTH 1113 Respiratory Therapy Seminar 3 1 QH
Continues discussion of topics introduced in RTH 1112, including introduction to life-support systems.

RTH 1211 Practicum in Respiratory Care 4 QH
The first course in a sequence of five designed to provide clinical experience in hospitals. Focuses on respiratory care for noncritical patients. Emphasizes infection control, medical gas administration, humidification of medical gases, aerosol therapy, chest physiotherapy, deep breathing treatments, and the administration of aerosol medications. *Prereq.* RTH 1331, RTH 1301, RTH 1332 concurrently, and RTH 1302 concurrently.

RTH 1301 Professional Practice Laboratory 1 1 QH
Provides practice in basic care skills through laboratory exercises and simulation of patient-care situations. Lab fee. *Prereq.* RTH 1331 concurrently.

RTH 1302 Professional Practice Laboratory 2 1 QH
Provides students with hands-on experience in working with respiratory therapy equipment. Sets up simulated patient-management problems in the lab to provide problem-solving experience. Lab fee. *Prereq.* RTH 1301, RTH 1332 concurrently.

RTH 1312 Practicum in Respiratory Care 4 QH
The second course in a sequence of five directly related to the clinical practice of various modalities of respiratory care. Focuses on treating patients with more complex cardiorespiratory disorders. *Prereq.* RTH 1332, RTH 1302, RTH 1433 concurrently, and RTH 1403.

RTH 1313 Practicum in Respiratory Care 6 QH
Provides clinical experience in hospitals. Emphasizes respiratory care for critical patients. Reviews advanced respiratory-care topics such as airway care, mechanical ventilation, and positive end expiratory pressure. *Prereq.* RTH 1433, RTH 1302, RTH 1434 concurrently, RTH 1404 concurrently.

RTH 1320 Cardiopulmonary Physiology 4 QH
Provides a detailed introduction to the clinical diagnostic procedures employed in evaluating cardiopulmonary patients and description of the etiology, pathophysiology, diagnosis, and treatment of major cardiopulmonary diseases. *Prereq.* Satisfactory completion of the first-year courses.

RTH 1321 Cardiopulmonary Disease 4 QH
Introduces clinical diagnostic procedures employed in evaluating cardiopulmonary patients and description of the etiology, pathophysiology, diagnosis, and treatment of major cardiopulmonary diseases. *Prereq.* Satisfactory completion of the first-year courses.

RTH 1331 Introduction to Patient Care 4 QH
Provides an opportunity for the student to gain knowledge and understanding of basic patient-care skills, including moving and positioning of patients, infection control, basic observation and assessment skills, and familiarity with the techniques of cardiopulmonary resuscitation. Also provides an opportunity for the development of the student's interpersonal and communication skills.

RTH 1332 Introduction to Respiratory Care 4 QH
Basic to all other professional respiratory therapy courses. Focuses on the theory and application of medical gas administration and humidity/aerosol therapy. *Prereq.* RTH 1331 and PCL 1309 concurrently.

RTH 1403 Professional Practice Laboratory 3 1 QH
Provides students with hands-on experience with respiratory therapy procedures. Sets up simulated patient-management problems in the lab to provide problem-solving experience. Lab fee. *Prereq.* RTH 1302, RTH 1433 concurrently.

RTH 1404 Professional Practice Laboratory 4 1 QH
Provides students with an opportunity to acquire experience in working with respiratory therapy life support equipment. Sets up simulated critical-care problems in the lab to provide problem-solving experience. Lab fee. *Prereq.* RTH 1403, RTH 1434 concurrently.

RTH 1414 Clinical Seminar 1 1 QH
Discusses clinical topics and respiratory-care problems encountered during clinical practice in the hospitals. *Prereq.* RTH 1312 concurrently.

RTH 1415 Clinical Seminar 2 1 QH
Discusses clinical topics and critical-care problems encountered during clinical practice in the hospital. *Prereq.* RTH 1313 concurrently.

RTH 1433 Respiratory Care for the Medical and Surgical Patient 4 QH
Continues the introduction to respiratory therapy, as the didactic portion of beginning clinical experience on noncritical patients. Focuses on respiratory-care problems following major surgery and those problems related to medical patients. *Prereq.* RTH 1332.

RTH 1434 Respiratory Care for the Critical Patient 4 QH
The last in a sequence of three directly related to the theory of respiratory therapy procedures; designed as the didactic portion of clinical experience on critical patients. Focuses on respiratory-care problems encountered with patients in intensive care units. *Prereq.* RTH 1433.

RTH 1435 Introduction to Perinatal/Pediatric Respiratory Care 2 QH
Provides the student with the opportunity to acquire knowledge and understanding of human cardiopulmonary development from the time of conception through childhood years. Emphasizes normal as well

as abnormal manifestations of pregnancy, labor, and the process of delivering. Examines methods and techniques of assessment and delivery of respiratory care related to the pediatric patient's pathophysiology of cardiopulmonary disease. *Prereq.* RTH 1434.

RTH 1505 Cardiopulmonary Laboratory Practice 1 QH

The lab portion of Cardiopulmonary Laboratory Technology. Focuses on the techniques of pulmonary functions testing, blood gas analysis, and cardiovascular testing commonly done in the clinical setting. Lab fee. *Prereq.* RTH 1535 concurrently.

RTH 1510 Perfusion Technology Practicum 1 6 QH

Provides perfusion technology students with the opportunity to develop, practice, and master skills required to perform extracorporeal circulation procedures. Also includes, but is not limited to, current methods in autotransfusion, myocardial preservation, and intra-aortic balloon support. *Prereq.* RTH 1570.

RTH 1511 Practicum in Critical Care 4 QH

Allows the student to select an area of emphasis from among the following: intensive care units, neonatal-pediatrics, or extracorporeal membrane oxygenation. During the practicum courses, provides students with an opportunity to work in their specialty areas. *Prereq.* RTH 1574, RTH 1578.

RTH 1512 Practicum in Critical Care 4 QH

Continues RTH 1511. *Prereq.* RTH 1511.

RTH 1515 Perfusion Technology Practicum 2 6 QH

Continues RTH 1510. *Prereq.* RTH 1514, RTH 1571, and RTH 1572.

RTH 1516 Advanced Clinical Seminar 1 1 QH

Complements RTH 1571. Discusses current clinical problems related to life-support systems problems encountered in the hospital. *Prereq.* RTH 1571 concurrently.

RTH 1517 Advanced Clinical Seminar 2 1 QH

Complements a professional elective taken concurrently. Discusses current clinical problems and research related to problems encountered in the hospital. *Prereq.* RTH 1572 concurrently.

RTH 1518 Advanced Clinical Seminar 3 1 QH

Complements RTH 1511. Discusses current clinical problems and emphasizes research related to critical-care problems. *Prereq.* RTH 1511 concurrently.

RTH 1519 Advanced Clinical Seminar 4 1 QH

Continues RTH 1518. Complements RTH 1512. *Prereq.* RTH 1512 concurrently.

RTH 1535 Cardiopulmonary Laboratory Techniques 4 QH

Provides the student with an opportunity to gain knowledge and background in principles, theory, and procedures encountered in a clinical cardiopulmonary lab. Focuses on the physiological foundations of cardiopulmonary testing. *Prereq.* RTH 1321 and permission of instructor.

RTH 1570 Fundamentals of Perfusion Technology 4 QH

Applies biologic, pharmacologic, and physical principles to extracorporeal cardiopulmonary support. Focuses on the basic theory and instrumentation of perfusion technology, emphasizing circuit design and function, oxygenator theory, pump dynamics, blood recovery and autotransfusion procedures, myocardial protection techniques, intraaortic counterpulsation, aseptic techniques, and surgical procedures. Provides an opportunity to work with perfusion equipment and to develop the psychomotor skills necessary to implement perfusion procedures. Lab.

RTH 1571 Advanced Life Support Systems 1 4 QH

Introduces students to selected techniques of advanced life support applied to the critically ill patient. *Prereq.* RTH 1434.

RTH 1572 Perfusion Technology 4 QH

Introduces students specializing in perfusion technology to the theory, principles, and concepts of cardiovascular perfusion. *Prereq.* RTH 1571.

RTH 1574 Advanced Clinical Physiology 4 QH

Provides respiratory therapy students with an opportunity for an in-depth exposure to medical physiology, based on the concept of the homeostatic state and its application to the clinical setting. *Prereq.* PAH 1204 and permission of instructor.

RTH 1576 Neonatal Respiratory Care 4 QH

Provides the student with an understanding of the methods and techniques of respiratory therapy for neonatal patients. Emphasizes mechanical ventilation, newborn care, and the respiratory distress syndrome. *Prereq.* RTH 1574.

RTH 1578 Advanced Medical Monitoring 4 QH

Provides students with an opportunity for an in-depth exposure to the theory and application of physiologic monitoring systems and their use in critical-care settings. *Prereq.* RTH 1574.

RTH 1631 Management of Respiratory Care Departments 4 QH

Exposes respiratory therapy students to the techniques, theories, and tools of management that will enable them to develop a workable management system for respiratory-care departments. Provides an overview and a basic conceptual understanding of the role and the task of managing. Deals with the functions, duties, and responsibilities of managers and the things managers must do. Alternates theoretical considerations with practical applicants (cases, questions, and exercises) to enhance learning.

RTH 1632 Methods and Materials of Teaching Respiratory Therapy 4 QH

Studies the systems approach to teaching respiratory therapy. Covers development of instructional goals based on a needs assessment, behavioral learning objectives, instructional strategies, and evaluation instruments. Emphasizes the use of criterion-referenced measurement strategies to evaluate mastery of clinical skills.

RTH 1633 Student Teaching and Seminar 4 QH

Involves part-time participation (12 hours per week) in a supervised respiratory-therapy learning experience designed to provide practice with didactic, laboratory, and clinical teaching. Gives students an opportunity to demonstrate, evaluate, and develop their teaching skills. Through a one-hour seminar held weekly, discusses problems encountered in the classroom, lab, and hospital.

RTH 1634 Rehabilitation of Patients with Respiratory Disorders 4 QH

Applies a broad definition of rehabilitation to the life situations of patients with respiratory disorders. Gives students the opportunity to learn specific skills that address the recognition and management of acute and chronic problems. Develops model systems of psychosocial as well as physical support based on these skills. Open to students in health or human service disciplines who have had clinical or field experience.

RTH 1635 Practicum in Pediatric Pulmonary Rehabilitation 1 QH

Involves counselorship under medical direction at a one-week summer camp for children with severe pulmonary disorders. Requires students to apply skills

acquired in RTH 1634 in residential camp situation and to respond to medical or psychosocial problems in a manner consistent with current methods in his/her discipline. Involves group and individual discussions with the instructor to clarify insights and experiences. Requires daily case reports to document the learning process. *Prereq.* RTH 1634 or permission of instructor; enrollment limited.

RTH 1801 Directed Independent Study 1 2 QH

Offers directed study in a student's major wherein in-depth investigation of a special interest area is undertaken. *Prereq.* RTH 1511 concurrently.

RTH 1802 Directed Independent Study 2 2 QH

Offers directed study in a student's major wherein in-depth investigation of a special interest area is undertaken. *Prereq.* RTH 1512 concurrently.

RTH 1810 Continuation of Clinical 0 QH

This six-week noncredit clinical course provides perfusion technology students with the opportunity to clear grades of I (Incomplete) in RTH 1515, Practicum in Perfusion Technology 2. At the end of the six-week period, students will be reevaluated using the criteria developed for RTH 1515, and I grades will be changed to the grades earned at that time.

Nursing

NUR 1100 Introduction to Professional Nursing and the Health System 4 QH

Surveys the social, political, and economic forces that influence the nursing profession. Considers the historical development of nursing and its role and contribution to American society. Introduces the United States health sector and the social, political, and economic factors that affect health-care delivery. Views concepts of health and illness from their meanings to the general population. Encourages students to explore individual goals in the nursing profession.

NUR 1101 Introduction to the Theoretical Basis for Nursing Practice 4 QH

Introduces the concepts and theories generally used in professional nursing practice and the major concepts in the nursing paradigm. Surveys the conceptual framework of the College of Nursing, the Roy Adaptation Model, and selected major theorists. Builds on the concepts of health, wellness, and illness. Introduces nursing processes and skills associated with data collection. Discusses communication as essential to professional role behavior. *Prereq.* NUR 1100.

NUR 1102 Introduction to Human Nutrition 4 QH

Explores the fundamental role of nutrition in promoting health. Studies the physiological functions of nutrients, their food sources, and recommended intakes for different age groups. Also examines the possible health significance of non-nutritive components of foods. Utilizes principles from the humanities and sciences in developing nutrition concepts.

Introduces the use of different diet-assessment tools to assist individuals in meeting nutrient and energy needs. Encourages students to examine their own food choices and how those choices translate into meeting recommended nutrient and energy needs. Discusses the origins of food habits and the relevance of nutrition counseling and education in nursing practice. *Prereq.* NUR 1100 or permission of instructor.

NUR 1200 Nursing Basic Human Needs 1 6 QH

Gives the opportunity to explore the professional role in a clinical setting. Building on knowledge of the Roy Adaptation Model, allows students to implement the nursing process in the four adaptive modes and also focus on psychomotor development skills. Offers students the chance to provide basic nursing care to selected clients. Through lectures and assignments, helps students utilize and explain scientific and conceptual bases for nursing activities. Explores professional responsibility in a legal and ethical framework with specific attention to the students' individual role development. *Prereq.* BIO 1115, BIO 1152, BIO 1153, CHM 1111, CHM 1112, NUR 1100, NUR 1101, NUR 1102, and sophomore standing.

NUR 1201 Nursing Basic Human Needs 2 6 QH

Allows students to continue developing in the professional role in a clinical setting. Emphasizes physical assessment and patient education. Offers students the chance to provide basic nursing care and to continue to strengthen their understanding of the nursing process by using the Roy Adaptation Model.

Through lectures and assignments, helps students expand their scientific and conceptual basis for nursing activities. *Prereq.* BIO 1120, BIO 1154, NUR 1200, and sophomore standing.

NUR 1202 Introduction to Pathophysiological Concepts for Clinical Nursing 4 QH

Uses Roy's Physiological Mode as a framework to focus on how the human body uses its adaptive power to maintain a steady state and how alterations cause a disruption in normal cellular processes. Reinforces an understanding of disease processes and their implications for nursing practice. *Prereq.* BIO 1115, BIO 1152, BIO 1153, BIO 1154, and sophomore standing.

NUR 1300 Common Problems 7 QH

Focuses on specific physiologic alterations and psychosocial adaptation in the health of adult clients and their families using the Roy Adaptation Model. Through the clinical practicum, provides the opportunity to administer nursing care by collaborating with faculty, clients, nurses, and other health-team members. Allows students, under faculty guidance and in an acute clinical setting, to assess, plan, implement, and evaluate nursing care for selected adult clients using the Roy Adaptation Model. *Prereq.* BIO 1254, NUR 1201, PSY 1111, PSY 1112, and middler standing.

NUR 1301 Psychiatric/Mental Health Nursing 7 QH

Examines the process used by the professional nurse in facilitating the adaptive responses and goal attainment of human systems. Specifically, focuses on the study of self-concept, role functioning, and interdependence among individuals, families, and groups. Studies the interpersonal process of professional nursing and how the nurse works with client systems in their striving toward survival, growth, reproduction, and mastery. Discusses how within this process, adaptive responses are enhanced and ineffective responses are altered. Uses the Roy Adaptation Model as the framework. *Prereq.* BIO 1254, NUR 1201, PSY 1111, PSY 1112, and middler standing.

NUR 1302 Transition 9 QH

Introduces registered nurse students to the purposes, philosophy, and conceptual framework of the baccalaureate degree program. Provides students the opportunity to complement and validate, through guided study, their knowledge of professional roles and role conflicts, communication and group process, and principles of teaching, learning, and evaluation. Uses the Roy Adaptation Model in providing nursing care, specifically with aging, chronically ill, and dying patients. Also discusses nutritional needs, with specific emphasis on aged, acute, and chronically ill individuals. *Prereq.* BIO 1120, BIO 1140, BIO 1141, BIO 1253, BIO 1255, CHM 1111, CHM 1112, PSY 1111, PSY 1112, and registered nurse license.

NUR 1303 Life Crises: Analysis and Response 4 QH

Considers personal, family, and community crises identified from literature, health agency clientele, and student sources. Uses concepts from nursing, sociology, anthropology, and social psychology to

assess critically the individual's experience of crisis and the approaches used by providers in human-service systems to help people in crisis. Gives students in consumer and/or health and human service roles the opportunity to critically examine the meaning of life crises in a social-cultural vs. psychopathological framework and to explore principles and creative strategies that might be used in responding constructively to crises in their own lives or in their experience as health or human-service workers. *Open to upper-division students in nursing, criminal justice, and applied social science, and the health professions.*

NUR 1304 Independent Study Elective 2 QH

Offers independent work on a chosen topic under the direction of members of the college. Allows student to contract with a faculty member whose background, interests, and time allow direction of an in-depth study and to develop course objectives. *Prereq.* NUR 1201.

NUR 1400 Maternal and Child Nursing 9 QH

Focuses on applying the Roy Adaptation Model in maintaining optimal health for child-bearing and child-rearing families. Using the four modes of the model, the student examines individuals and families at selected developmental stages. Presents theoretical content in four units, with the first two focusing on adaptive behaviors and the second two examining ineffective behaviors. Gives students the opportunity to assist clients in selected maternity and child-care settings in coping with the stress and stimuli that interfere with the adaptation process. *Prereq.* NUR 1300, NUR 1301, PCL 1305, PSY 1241, PSY 1242, and junior standing.

NUR 1401 Medical-Surgical Nursing 9 QH

Focuses on the effects of episodes of acute illness on individuals, families, and community. Addresses the four modes of the Roy Adaptation Model. Emphasizes the alterations and adaptations in physiology characteristic of acute episodes of illness and the nurse's role in intervention. Also discusses the impact of illness on patterns of living, the needs for health teaching, and continuity of care. Provides guided clinical experiences, emphasizing the nursing process and the skills necessary to plan and implement care for adults in an acute-care setting. *Prereq.* NUR 1300, NUR 1301, PCL 1305, PSY 1241, PSY 1242, and junior standing.

NUR 1402 Health Assessment 4 QH

Provides the student with additional theory and skills relevant to the clinical decision-making role of the nurse as a primary caretaker. Extends the student's knowledge and experience of history-taking and physical and psychosocial assessment. Emphasizes analysis and synthesis of data obtained from a holistic health assessment as an essential framework for the identification of common health abnormalities and the enhancement of the nurse's clinical decision-making skills. *Prereq.* NUR 1300, NUR 1301, or NUR 1302. *Open to upper-division students in nursing.*

NUR 1403 The Nurse Planner and Coordinator of Nursing Care 4 QH

Focuses on the nurse as a planner and coordinator of nursing care. Examines the theoretical base for organizing and facilitating the delivery of efficient and appropriate nursing services to client/patients across various settings. Explores concepts from nursing, organizational theory, decision-making theory, and leadership and management theory to heighten the professional nurse's awareness of the complexity of human and material resources required for the delivery of nursing care to clients and the importance of collaboration with a variety of providers. *Open to upper-division students in nursing.*

NUR 1404 The Nurse Entrepreneur 4 QH

Focuses on the role of the nurse as an entrepreneur. Within the generic functions of nursing, studies situations of patient family teaching that provide the framework for introducing students to the essentials of undertaking this function as a business venture. Includes the formation of a nurse entrepreneur's venture action plan to do patient and family teaching. *Open to upper-division students in nursing.*

NUR 1500 Community Health Nursing 9 QH

Focuses on the use of the nursing process in working toward the adaptation of individuals, families, groups, and communities. Examines utilization of the Roy Adaptation Model in addressing client needs. Analyzes the interrelationship of client and environmental factors as they relate to the attainment of health goals. Discusses the influence of the role of

the community health nurse and cultural, political, socioeconomic, and epidemiological factors on client adaptation. *Prereq. NUR 1400, NUR 1401, PSY 1242, SOA 1100, and senior standing.*

NUR 1501 Contemporary Issues in Nursing 5 QH

Analyzes sociological, political, legal, economic, ethical, historical, and ideological factors affecting contemporary nursing practice and the health-care system. Synthesizes professional role issues. *Prereq. NUR 1400, NUR 1401, SOC 1100, and senior standing.*

NUR 1502 Introduction to Research in Nursing 4 QH

Builds on students' prior exposure to select studies applied to nursing. Discusses and critiques qualitative and quantitative research and the value of each to the practice of nursing and to the health-care field. Examines the importance of research in nursing to both practitioner and consumer. *Prereq. NUR 1400, NUR 1401, SOA 1100, and senior standing.*

NUR 1503 Advanced Clinical Care 4 QH

Builds on students' clinical nursing experiences. Focuses on analyzing, synthesizing, and prioritizing solutions to patients' problems, using the case study format. Applies concepts of pathophysiology, nutrition, pharmacotherapeutics, stress, and crisis to acutely ill clients in case simulations. Develops clinical nursing judgment with acutely ill patients in adult, maternal, and child populations. *Prereq. NUR 1400 and NUR 1401. Open to upper-division students in nursing.*

Criminal Justice

CJ 1101 Administration of Criminal Justice 4 QH

Surveys the contemporary criminal justice system from the initial contact with the offender through prosecution, disposition, incarceration, and release to the community. Emphasizes major systems of social control: police, corrections, juvenile justice, mental health systems, and their policies and practices relative to the offender. Maintains balanced study by providing legal, empirical, and sociological materials.

CJ 1110 Topics in History of Criminal Justice 4 QH

Provides a historic survey of the principles of criminal justice in the ancient and medieval periods, with emphasis on the impact of religion and philosophy.

CJ 1111 Topics in History of Criminal Justice 4 QH

Continues the historic survey with an examination of the effects of the Renaissance and the Reformation and the rise of nation states.

CJ 1112 Critical Issues in Criminal Justice and Criminology 4 QH

Introduces students to the major issues and ethical considerations facing criminal justice and criminology today. Discusses six to eight major critical,

moral, and ethical issues. Considers such core topics as the death penalty, abortion, euthanasia, abolition of the insanity plea, victimless crimes (prostitution, drug abuse, gambling), and gun control. Presents these issues in the format of pros and cons; involves student presentations or debates.

CJ 1151 Introduction to Law and the Legal Process I 4 QH

Provides an introduction to the law and the legal system of the United States. Sets forth the fundamentals of our legal process and provides a summary description of both the private and public law system. Presents an overview of the traditional structure, as well as the basic principles of law.

CJ 1152 Introduction to Law and the Legal Process 2 4 QH

Continues the material presented in CJ 1151. Introduces basic tort and contract principles, administrative law, and governmental regulation of business, topics of particular concern to criminal justice professionals in both the public and private sectors, as well as to those students concentrating in legal studies. *Prereq. CJ 1151 and CJ 1252.*

CJ 1201 Criminology**4 QH**

Covers patterns and evolution of criminal behavior, the social forces involved, and development of the individual criminal. Examines administration of criminal justice—law, courts, police, prisons.

CJ 1251 Introduction to Criminal Law**4 QH**

Deals with the area of criminal responsibility, some of its limitations, and certain modifications substantially affecting it. Requires an ability to express in writing both the knowledge of a particular concept and the ability to identify it in a complex fact pattern and discuss its implications and ramifications.

CJ 1252 Criminal Due Process**4 QH**

Focuses on a historical evaluation of the Fourteenth Amendment and its use in making rights prescribed under the Bill of Rights applicable to the individual states. Also details the inherent problems of the Fifth and Sixth Amendments, including the effect of their implications on such matters as police practices, illegal search and seizure, and right to counsel. Expects students to be familiar with basic concepts as well as changing interpretations so they can cite cases that may stand as precedents for conclusions they draw. *Prereq. CJ 1251.*

CJ 1253 Introduction to Criminal Courts**4 QH**

Examines the role of criminal courts in the United States, the structure and organization of the court system, and the flow of cases from arrest to conviction. Focuses on the key actors in the courtroom—prosecutors, defense attorneys, judges, and court clerks—and the decision-making processes in charging, setting bail, pleading guilty, going to trial, and sentencing. Addresses prospects for reforming courts. *Prereq. CJ 1251 and CJ 1252.*

CJ 1254 Civil Liability in Criminal Justice**4 QH**

Studies the contemporary problems of civil liability affecting the criminal justice professional. Reviews cases involving police, security, probation, parole, and corrections personnel to help students understand and appreciate the legal factors, public policy issues, and methods of reducing the risk of civil liability. *Prereq. CJ 1251, and CJ 1252.*

CJ 1301 Introduction to Security**4 QH**

Examines the organization and administration of security and loss prevention programs in industry, business, and government. Emphasizes the protection of assets, personnel, and facilities and focuses on the relations between security organizations and government agencies.

CJ 1311 White-Collar Crime**4 QH**

Gives the student a basic understanding of white-collar crime. Covers such topics as the nature and extent of white-collar crime, the social-psychologic makeup of white-collar crime, typologies, current efforts directed toward controlling it, and the inter-agency and jurisdictional problems and the benefits of cooperation.

CJ 1314 Security Management and Supervision**4 QH**

Deals with the roles and responsibilities of the security manager. Gives special attention to the respon-

sibilities of planning, organizing, staffing, directing, controlling, representing, and innovating. Explores the manager's responsibility in professionalizing security and other relevant issues. *Prereq. CJ 1301 or equiv.*

CJ 1315 Security Design and Technology**4 QH**

Acquaints students with options and applications of today's scientific and technological products. Attempts to prepare students in security planning and to develop managerial skills needed to plan security systems using the state-of-the-art technology. *Prereq. CJ 1301 or equiv.*

CJ 1318 Terrorism**4 QH**

Attempts to give the student an understanding of what terrorism is and why it has become so popular. Includes the role of news media, political consequences of terrorism, the military as a resource, and the role of the hostage.

CJ 1319 Legal Aspects of Security Management and Operations**4 QH**

Provides a comprehensive examination of the legal environment and issues affecting security operations and management. Analyzes elements of criminal, civil, property, regulatory, and business law from the perspective of organizational security management concerns. Includes legal basis of security practices, civil liability, corporate security, investigations, labor law, industrial espionage, governmental security issues, and other relevant topics.

CJ 1401 Law Enforcement Administration and Management**4 QH**

Covers the principles of police organization, administration, and management, including staff and line functions, chain of command, span of control, selection of personnel, and promotional systems. Also considers special problems such as strikes, natural and atomic disasters, narcotic traffic, and vice control.

CJ 1411 Police Operations**4 QH**

Offers a general survey of police operational procedures, including patrol, traffic, interrogations, and report writing. Uses role playing to demonstrate interviewing methods. *Prereq. CJ 1401.*

CJ 1421 Police-Community Relations**4 QH**

Covers police-public contact; uses of the communications media in projecting the police image; responsibilities of police in dealing effectively with minority groups, civil rights, civil disorder, and public protection. Explores the role and function of the police in intergroup relations. *Prereq. CJ 1401, CJ 1411, and junior or senior standing.*

CJ 1424 Seminar in Law Enforcement**4 QH**

Specific topic in law enforcement to be announced. *Prereq. CJ 1401, CJ 1411, and junior or senior standing.*

CJ 1425 Police Discretion**4 QH**

Examines the nature and impact of discretion as it relates to police decision making. Gives attention to various forms of police discretion and ways in which it can be structured, confined, and checked. Gives

students the opportunity to examine and analyze sample police department policies and to study different formal and informal methods of developing policies. Also studies the relation of discretion to controlling police behavior and police corruption. *Prereq.* *Middler, junior, or senior standing.*

CJ 1426 Topics in Law Enforcement 4 QH
Specific topic in law enforcement to be announced. *Prereq.* *Junior or senior standing.*

CJ 1427 Topics in Criminal Justice 4 QH
Specific topic in criminal justice to be announced. *Prereq.* *Junior or seniors standing.*

CJ 1451 Criminal Justice Research 4 QH
Surveys methods for basic and applied research in criminal justice, combining statistics and research methods. Concentrates on research application by stressing discussion of the general role of research in the discipline and specific contributions advanced by studies in the literature. *Prereq.* *MTH 1010 or equiv., and middler, junior, or senior standing.*

CJ 1501 Evidence 1 4 QH
Provides students the opportunity to develop their understanding of the manner in which legal issues and disputes are resolved by trial. Focuses on the manner in which the trial system works and the reasoning behind the rules governing its operation, including rules of evidence: the mechanics of the adversary system, relevancy, reliability, and rules of exclusion based on policy considerations other than relevancy and reliability. Includes such learning tools as videotapes, mock trials, observation of actual court trials, lectures, take-home assignments, and exams. *Prereq.* *CJ 1251, CJ 1252.*

CJ 1502 Evidence 2 4 QH
Continues with reliability and rules of exclusion, based on policy considerations other than relevancy and reliability, as set forth in CJ 1501. *Prereq.* *CJ 1501.*

CJ 1512 Seminar in Law and Criminal Justice 4 QH
Specific topic in the law and criminal justice to be announced. *Prereq.* *CJ 1251, CJ 1252, and junior or senior standing.*

CJ 1513 Criminal Homicide 4 QH
Surveys the topic of homicide. Explores general murder patterns and analyzes types of homicide emphasizing mass and serial killing. Discusses criminal justice issues in apprehension, prosecution, and punishment of murder.

CJ 1601 Survey of Correctional Systems 4 QH
Offers an introduction to penology and corrections. Explores the public reaction to convicted offenders historically, while concentrating on issues and programs of contemporary corrections. *Prereq.* *CJ 1201.*

CJ 1612 Juvenile Justice 4 QH
Gives an overview of the institutional response to the problems of juvenile delinquency, juvenile misconduct, and dependent/neglected and abused children. Emphasizes the police, court, and correctional agencies that process young people. In addition, devotes attention to an understanding of the history of the system, recent legal developments, and an assessment of current proposals for reform. *Prereq.* *SOC 1100 and CJ 1201.*

CJ 1613 Probation and Parole 4 QH
Examines the nature and problems of correctional field service, both adult and juvenile. *Prereq.* *CJ 1601.*

CJ 1615 Crime and Criminal Justice: A Comparative View 4 QH
Examines the problems of crime and its control from the vantage point of the comparative perspective. Analyzes countries such as Soviet Russia, China, France, East Germany, and West Germany. Also analyzes Great Britain, Holland, Finland, and Sweden in terms of their incidence and type of deviance and crime, as well as in terms of approach to social control and prevention of crime. Examines points of divergence between these countries and the United States in perceived causes of crime and differing approaches to rehabilitation and crime prevention. *Prereq.* *CJ 1101, SOC 1100, or equiv.*

CJ 1616 Women and the Criminal Justice System 4 QH
Introduces students to issues relating to roles taken by women involved with the criminal justice system and to the system's various responses to women in these roles. Focuses on women as victims of crime, as offenders, and as practitioners. *Prereq.* *Middler, junior, or senior standing.*

CJ 1618 Victims of Crime 4 QH
Examines current theory and research regarding victims of crime. Devotes attention to concepts such as victim vulnerability and victim culpability. In addition, discusses the implications of a victim-oriented perspective for the administration of justice. Assesses current victim programs, including restitution, mediation, and compensation.

CJ 1801, CJ 1802, CJ 1803, CJ 1804 4 QH each
Directed Study

Military Science

AIR 1110 Air Force Today 1 4 QH
Examines the role of the United States Air Force in the contemporary world. Surveys background, mission, and organization of the Air Force and functions of United States strategic forces. Also emphasizes development of written communicative skills.

AIR 1111 Leadership Laboratory 1 4 QH
Introduces the customs, traditions, and courtesies of the Air Force through guest speakers, seminars, and a field trip to an Air Force base.

AIR 1120 Air Force Today 2 **1 QH**
Continues study of the contemporary Air Force by examining general-purpose forces, aerospace support forces, and the total force structure.

AIR 1121 Leadership Laboratory 2 **1 QH**
Continues AIR 1111, with emphasis on the role and responsibilities of an Air Force company grade officer.

AIR 1210 Development of Air Power **1 QH**
Traces the history of the development of air power from balloon experiments up through World War II. Emphasizes interrelation of technology, doctrine, and historical events. Emphasizes student participation and presentations to enhance verbal skills.

AIR 1211 Leadership Laboratory 3 **1 QH**
Emphasizes development of techniques used to direct and inform. Assigns students to leadership and management positions in the AIR 1111 programs previously described.

AIR 1220 Development of Air Power **1 QH**
Traces the history of airpower since 1946, with emphasis on the United States Air Force. Includes the role of air forces in conflicts and the effect of space-age technology on air power. Also examines the employment of U.S. air power in peaceful ways.

AIR 1221 Leadership Laboratory 4 **1 QH**
Continues AIR 1211. Adds a special program in preparation for field training.

AIR 1310 Management and Leadership 1 **4 QH**
Examines management and leadership from the point of view of the Air Force junior officer. Covers the individual motivational and behavioral processes, leadership, communication, and group dynamics to provide a foundation for the development of the junior officer's professional skills as an Air Force officer.

AIR 1311 Leadership Laboratory 7 **1 QH**
Provides supervisory practice and exercise of leadership functions in controlling and directing activities of the cadet group. Develops leadership potential in a practical, supervised training lab.

AIR 1320 Management and Leadership 2 **4 QH**
Continues AIR 1310 with special emphasis on the basic managerial processes involving decision making, utilization of analytical aid in planning, organizing, and controlling in a changing environment. Discusses organizational and personal values, management of forces in change, organizational power, politics, and managerial strategy and tactics in the context of the military organization. Uses actual Air Force cases to enhance the learning and communication processes.

AIR 1321 Leadership Laboratory 8 **1 QH**
Continues AIR 1311. Emphasizes supervisory and leadership skills. Discusses advantages of an Air Force career.

AIR 1410 National Security Forces 1 **4 QH**
Studies the military's role as an institution in a democratic society. Includes such topics as civil-military

interaction and the military as a profession. Emphasizes developing communicative skills through student presentations.

AIR 1411 Leadership Laboratory 5 **1 QH**
Focuses on exercise of management functions in planning, supervising, and directing cadet group activities. Provides opportunity to acquire proficiency in military leadership skills.

AIR 1420 United States National Security Forces 2 **4 QH**
Studies the role of the military in maintaining the security of the United States. Examines the international environment, the background of defense policy, strategy, and forms of conflict. Addresses specific issues, including weapons acquisition, arms control, nuclear deterrence, and the national military decision-making process.

AIR 1421 Leadership Laboratory 6 **1 QH**
Continues AIR 1411. Gives students the opportunity to prepare themselves for professional duties.

ARM 1100 Leadership Laboratory 1 **0 QH**
Introduction of first-year ROTC students to the basic tenets of discipline and regimentation of the United States Army. Includes the basics of proper wear of military clothing, proper rendering of military courtesies, military customs and traditions, individual and group drill and ceremonies, manual of arms for the M16A1 rifle, and physical fitness training.

ARM 1101 Introduction to Organizational Structure **1.5 QH**

Uses the United States Army to introduce the beginning management student to the nature of organizations. Discusses types of organizational structures, the principles of organizational development, organizational evolution, vertical and horizontal growth and mobility, organizational leadership, and the role of the entry-level manager within the organization. Focuses on the need for lower-level managers to be technically competent and skilled in various aspects of human resource management to satisfy the needs of the organization as well as to prosper personally.

ARM 1102 Leadership vs. Management Styles **1.5 QH**
Teaches leadership and management concepts. Illustrates particular management skills: problem analysis and decision-making, planning and organizing, delegation and control, and interpersonal skills. Uses realistic management simulations and structured exercises to teach essential leadership skills.

ARM 1103 Winning Strategies for Small Organizations **1.5 QH**

Assists students, regardless of their fields of study, in developing winning strategies through the practical application of proven management, time allocation, and planning sequence techniques specifically designed for small organizations. Introduces students to management by objective as a technique to facilitate the focusing of critical resources at the time and place most needed. Also discusses how the small organization's structure and leadership hierarchy affects goal outcome.

ARM 1200 Leadership Laboratory 2 0 QH

Presents introduction and hands-on training for second-year ROTC cadets. Includes required basic military skills, including nuclear, biological, and chemical protective training; selected weapons training; use of United States Army communications equipment; land navigation; orienteering; rappelling; and limited military vehicle maintenance training.

ARM 1201 Basic Rifle Marksmanship 1 QH

Provides instruction and practical application in basic rifle marksmanship techniques, safety, and range operations.

ARM 1202 Comparative Armies 1.5 QH

Presents an introduction to the roles and organization of the United States Army's Active, Reserve, and National Guard. Utilizing these concepts as building blocks, examines and compares armies currently affecting United States doctrine and tactics. Integrates the Soviet, Warsaw Pact, NATO, and other world forces into the course structure through the study and examination of current events inside and outside the military establishment.

ARM 1203 Military First Aid 1.5 QH

Introduces the fundamentals of military first aid. Includes evaluation of a casualty, mouth-to-mouth resuscitation, cardiopulmonary resuscitation, first aid for burns, and appropriate temperature prevention program.

ARM 1300 Leadership Laboratory 3 0 QH

Provides advanced leadership applications for the middler-year Army ROTC cadets. Includes the review and hands-on training of all basic military skills learned in the ROTC basic program of instruction. Gives middler cadets increased leadership responsibility within the cadet battalion for further development and evaluation as well as preparation for their junior year Camp All American platoon training.

ARM 1301 Land Navigation 2 QH

Gives students the opportunity to learn how to identify map symbols to natural and manmade features; identify/use military grid reference system; measure straight line and read distance on a map; measure and plot an azimuth; convert azimuth from grid to magnetic grid; grid; locate an unknown point using polar coordinates; locate an unknown point using intersection; locate an unknown point using resection; determine the evaluation of a specific point on the map; inspect a compass for accuracy; navigate from one point on the ground to another. *Prereq. Basic course completion.*

ARM 1302 Advanced Tactical Planning 2 QH

Introduces the fundamentals of offensive and defensive combat at the squad and platoon levels. Includes unit organizations and capabilities, tactical planning, combat orders. Utilizes practical exercises placing the student in leadership roles in simulated tactical environments. Additionally, examines the proper method to conduct briefings, provide training input, and prepare, conduct, and evaluate training. *Prereq. Basic course completion.*

ARM 1303 Advanced Leadership Clinic 2 QH

Provides classroom, programmed instruction, and practical exercises (for example, land navigation, physical conditioning, weapons familiarization, and leadership) designed to prepare cadets for maximum individual performance at the six-week ROTC advanced camp. Required for all cadets attending advanced summer camp at Fort Bragg, North Carolina. *Prereq. Basic course completion.*

ARM 1305 Advanced Leadership Laboratory 5 6 QH

Provides external leadership lab conducted at Fort Bragg, North Carolina, during the summer quarter. As an intensive six-week course, includes application of leadership principles in positions at varying levels of responsibility. Also includes supplemental instruction such as physical conditioning, counseling, senior-subordinate relations, tactical doctrine, international laws of land warfare, and approaches to problem solving. Course attended by students from 123 colleges and universities from Maine to Florida. All expenses borne by the United States government, including a stipend of approximately five hundred dollars.

ARM 1400 Leadership Laboratory 4 0 QH

Gives fourth-year ROTC cadets practical application of previously learned skills, techniques, education, and experience by assisting ROTC cadre in the conduct of ARM 1100, ARM 1200, and ARM 1300. Gives cadets an opportunity to prepare and present instruction, manage constrained resources, and supervise subordinates. Evaluates cadets based on active-duty Army criteria. Requires attendance by all fourth-year ROTC cadets enrolled in an ROTC course.

ARM 1401 Organization and Communications Skills 2 QH

Examines the theory, methods, and principles for understanding and motivating human behavior in organizations. Emphasizes the principles and dynamics of leadership. Directs those principles toward the development of leadership styles. Introduces the officer and noncommissioned officer evaluation system. Makes practical applications through the use of case studies and group processes. *Prereq. Basic course completion.*

ARM 1402 Military Law and Ethics 2 QH

Examines the issues and responsibilities imposed by law on commanders and staff officers in two broad areas: the military criminal justice system and military administrative law. Presents in-depth analysis of the responsibilities and duties of officers and noncommissioned officers operating in the military justice system. Focuses on the legal basis for command and on administrative due process, judicial review of military activities, and other topical issues. Gives students the opportunity to address and develop an understanding of the need for ethical conduct, and an awareness and sensitivity to ethical issues. *Prereq. Basic course completion.*

ARM 1403 Leadership Seminar and Ethics 2 QH

Provides senior ROTC cadets with need-to-know information that facilitates their entry into active

duty. Also provides a forum for the study of personnel, training, logistical, and installation support systems. Discusses personal finances as well as the officer and noncommissioned officer evaluation systems. Gives students the opportunity to address and develop an understanding of the professional ethics of officership, including the need for ethical conduct, and an awareness of and sensitivity to ethical issues.

Prereq. Basic course completion.

NAV 1100 Naval Science Laboratory **0 QH**

Focuses on either drill instruction or practical work to complement classroom instruction. Must be taken in each class quarter by all NROTC students.

NAV 1101 Introduction to Naval Science **3 QH**

Presents a general introduction to the naval profession and the concepts of seapower. Emphasizes the mission, organization, and warfare components of the United States Navy and Marine Corps. Includes an overview of officer and enlisted ranks and rates, training and education, and career patterns. Also covers naval courtesy and customs, military justice, leadership, and nomenclature. Exposes the student to the professional competencies required to become a naval officer.

NAV 1102 Naval Ships Systems 1 **4 QH**

Studies in detail ship characteristics and types, including ship design, hydrodynamic forces, stability, compartmentation, propulsion, electrical and auxiliary systems, interior communications, ship control, and damage control. Includes basic concepts of the theory and design of steam, gas turbine, and nuclear propulsion. Also discusses shipboard safety and firefighting.

NAV 1201 Naval Ships Systems 2 **4 QH**

Outlines the theory and employment of weapons systems. Explores the processes of detection, evaluation, threat analysis, weapon selection, delivery, guidance, and explosives. Discusses fire control systems and major weapons types, including capabilities and limitations. Describes the physical aspects of radar and underwater sound in detail. Explores the facets of command, control, and communications as a means of weapons system integration.

NAV 1202 Seapower and Maritime Affairs **3 QH**

Surveys United States naval history from the American Revolution to the present with emphasis on major developments. Includes an in-depth discussion of the geopolitical theory of Mahan. Also treats present-day concerns in seapower and maritime affairs, including the economic and political issues of merchant marine commerce, the law of the sea, the Russian navy and merchant marine, and a comparison of United States and Soviet naval strengths.

NAV 1301 Navigation and Naval Operations 1 **4 QH**

Studies piloting and celestial navigation, including theory, principles, and procedures. Focuses on piloting navigation, including the use of charts, visual and electronic aids, and the theory and operation of magnetic and gyro compasses. Covers celestial

navigation in depth, including the celestial coordinate system, an introduction to spherical trigonometry, the theory and operation of the sextant, and a step-by-step treatment of the sight reduction process. Gives students the opportunity to develop practical skills in both piloting and celestial navigation. Discusses other topics such as tides, currents, effects of wind and weather, plotting, use of navigation instruments, types and characteristics of electronic navigation systems, and the day's work in navigation.

NAV 1302 Navigation and Naval Operations 2 **4 QH**

Studies the international and island rules of the nautical road, relative-motion vector-analysis theory, relative motion problems, formation tactics, and ship employment. Also includes an introduction to naval operations and operations analysis, ship behavior and characteristics in maneuvering, applied aspects of ship handling, and afloat communications.

NAV 1310 Evolution of Warfare **4 QH**

Traces the development of warfare from the dawn of recorded history to the present, focusing on the impact of major military theorists, strategists, tacticians, and technological developments. Gives the student the opportunity to acquire a basic sense of strategy, to develop an understanding of military alternatives, and to see the impact of historical precedent on military thought and action.

NAV 1401 Leadership and Management 1 **3 QH**

Studies at an advanced level organizational behavior and management in the context of the naval organization. Includes such topics as the management functions of planning, organizing, and controlling; individual and group behavior in organizations; and motivation and leadership. Explores major behavioral theories in detail. Investigates practical applications by the use of experiential exercises, case studies, and lab discussions. Develops other topics, including decision making, communication, responsibility, authority, and accountability.

NAV 1402 Leadership and Management 2 **3 QH**

Studies naval junior officer responsibilities in naval administration. Exposes the student to a study of counseling methods, military justice administration, naval human resources management, directives and correspondence, naval personnel administration, material management and maintenance, and supply systems. As the capstone course in the NROTC curriculum, builds on and integrates the professional competencies developed in prior course work and professional training.

NAV 1410 Amphibious Warfare **4 QH**

Surveys the historical development of amphibious doctrine and the conduct of amphibious operations. Emphasizes the evolution of amphibious warfare in the twentieth century, especially during World War II. Explores present-day potential and limitations on amphibious operations, including the rapid deployment force concept.

Cooperative Education

COP 1135 Professional Development for Journalists 1 QH

Provides current career information in the field of journalism. Prepares journalism students for the cooperative education experience as well as introducing them to the academic preparation necessary to pursue a successful career in the journalist profession. Focuses on effective resume writing, letters of application, and interviewing techniques specifically geared to those who intend to pursue a career in journalism.

COP 1180 Career Decision-Making 4 QH

Focuses on needs and concerns of students who may be undecided or uncertain about their academic major or career direction. Addresses the needs of the group, as well as individual participants, and emphasizes self-assessment, career exploration, decision making, and goal setting. *Prereq. Freshmen or sophomores in any major or permission of instructor.*

COP 1220 Working in the United States 4 QH

As a career development course for international students in their first-through-third years, helps students compete more effectively for cooperative edu-

cation positions in the United States and assists them in their cultural transition into the American work force. Considers work-oriented cross-cultural issues, the American work ethic, skills development, resume writing, and interviewing techniques. *Prereq. International students only.*

COP 1314 Life/Career Planning 4 QH

Focuses on career exploration, self-assessment, job-search techniques, and networking. Requires students to prepare a professional resume, to participate in videotaped mock interviews, to research careers, and to investigate graduate and professional schools. *Prereq. Junior or senior in any major standing or permission of instructor.*

COP 1353 Professional Development for Education 1 QH

Examines career management issues for fourth-year students. Discusses work and personal values, current issues in the employment market, planning for graduate study, organizing and conducting a job search, advanced resume preparation, and interviewing techniques.

Alternative Freshman-Year Program

The following courses will be offered in the Alternative Freshman-Year Program during the 1990–1991 academic year.

ECN 4601 Economics I 4 QH

Examines development of macroeconomic analysis, national income concepts, national income determination fluctuation and growth, role of the banking system and the Federal Reserve System, government expenditures and taxation, international trade, and balance of international payments.

ED 4001 Integrated Language Skills Development I 2 QH

Strives to improve a student's reading comprehension and related study and language skills. Devotes time, discussion, and considerable practice to meaning skills such as basic reading comprehension and interpretation, including work in critical reading and other interpretational acts (inferences, understanding imagery, and symbolic usage). Focuses on study skills, previewing, finding main ideas and details, outlining and summarizing, continuous interaction, and interaction of all the communications skills—reading, writing, listening, and speaking.

ED 4002 Integrated Language Skills Development 2 2 QH

Continues discussion of topics introduced in ED 4001. *Prereq. ED 4001.*

ED 4003 Integrated Language Skills A 4 QH

Strives to improve a student's reading comprehension and related study and language skills. Devotes

time, discussion, and considerable practice to meaning skills such as basic reading comprehension and interpretation, including work in critical reading and other interpretational acts (inferences, understanding imagery, and symbolic usage). Focuses on study skills, previewing, finding main ideas and details, outlining and summarizing, continuous interaction, and interaction of all the communications skills—reading, writing, listening, and speaking.

ED 4004 Integrated Language Skills B 4 QH

Extends ED 4003, with continued emphasis on study skills, including researching, organizing, and writing term papers. Explores critical thinking as it relates to the learning process. Also addresses the choices of academic major and career direction, emphasizing self-assessment and personal decision making. *Prereq. ED 4003.*

ENG 4013 Fundamentals of English I 4 QH

Presents an intensive introduction to the principles of effective expository writing. Emphasizes description, paragraph construction, and organization. Reviews English usage, punctuation, and syntax. Includes essay assignments.

ENG 4014 Fundamentals of English 2 4 QH

Presents intensive instruction in exposition, argument, and academic essay writing and includes

instruction in the writing of a research paper. Continues emphasis on English usage, punctuation, and syntax. Includes essay assignments.

HST 4110 History of Civilization A **4 QH**

Covers the major ideas and institutions of civilization from ancient times to 1648.

HST 4111 History of Civilization B 4 QH

Continues HST 4110, covering the period since 1648.

MGT 4110 Survey of Business and Management 4 QH

Offers an introduction to the setting and general structure of American business, the characteristics of private enterprise, and the nature and challenge of capitalism and other forms of economic enterprise. Discusses the forms of business, the structure of organization, and the functions of management in the context of their influence on the various forms of business. Through lecture and class discussion, the student gives an overview of the methodologies used in planning, organizing, directing, and controlling the functions of production, marketing, sales, pricing, and finance.

MTH 1000 Mathematical Preliminaries 1 **4 QH**

Reviews precollege mathematics, primarily arithmetic. Covers operations with numbers, fractions, decimals, percents, and graphs (pictographs, bar graphs, circle graphs, etc.), together with applications of these skills and concepts.

MTH 1010 Mathematical Preliminaries 2 4 QH

Surveys precollege algebra, including signed numbers, exponents, multiplication of polynomials, fac-

toring, linear equations, graphing, and radicals. For students whose background in algebra is weak.

MTH 1113 College Mathematics for Business 4 QH

Examines sets, rectangular coordinates and graphs, functions and functional notation, linear and quadratic functions, exponential and logarithmic functions, systems of linear equations, summations, inequalities, permutations and combinations, elementary probability concepts, arithmetic and geometric progressions, simple and compound interest, and annuities.

POL 4106 Introduction to Politics **4 QH**

Studies the basic political concepts and forces of organization from the classical Greeks to the modern nation-state. Contrasts the Soviet Union and the United Kingdom as contemporary illustrations of the institutional distinction between a totalitarian and a constitutional system.

SOC 4010 Principles of Sociology 1 **4 QH**

Introduces basic concepts and theories relating to the study of humans as participants in group life. Emphasizes socialization, culture, social structure, primary groups, family, social stratification, and population.

SOC 4011 Principles of Sociology 2 **4 QH**

Continues SOC 4010. Emphasizes critical analysis of American society, with attention to problems of social, political, urban, and industrial change.

Appendix

Academic Calendar 1990–1991

September 1990

| | | |
|-------|------------------|--|
| 3 | Monday | Labor Day. University closed. |
| 4–7 | Tuesday–Friday | Final examinations for Basic Colleges. |
| 10–19 | Monday–Wednesday | Division B vacation. |
| 13 | Thursday | Fall commencement. |
| 17 | Monday | Freshman and transfer students orientation and University registration. |
| 20 | Thursday | Upperclass registration (Division B) 9 AM. |
| 19–21 | Wednesday–Friday | Continuation of course advising, course registration, course drop/add periods, and orientation for college day programs. |
| 24 | Monday | Classes begin in Basic Colleges for fall quarter at 8 AM. |

October 1990

| | | |
|---|--------|----------------------------------|
| 8 | Monday | Columbus Day. University closed. |
|---|--------|----------------------------------|

November 1990

| | | |
|-------|-------------------|----------------------------------|
| 12 | Monday | Veterans Day. University closed. |
| 22–24 | Thursday–Saturday | Thanksgiving Day recess. |

December 1990

| | | |
|-------|---------------|--|
| 10–14 | Monday–Friday | Final examinations for Basic Colleges. |
| 17–31 | Monday–Monday | Christmas vacation. |

January 1991

| | | |
|----|-----------|--|
| 1 | Tuesday | New Year's Day. University closed. |
| 2 | Wednesday | Orientation and registration for new freshmen and transfers; registration for continuing September freshmen and returning upperclass students (Division A) |
| 3 | Thursday | Registration, orientation, and course drop/add continues until noon. |
| 4 | Friday | Classes begin in Basic Colleges for winter quarter at 8 AM. |
| 21 | Monday | Martin Luther King, Jr.'s Birthday observed. University closed. |

February 1991

| | | |
|----|--------|------------------------------------|
| 18 | Monday | Presidents Day. University closed. |
|----|--------|------------------------------------|

March 1991

| | | |
|-------|-----------------|--|
| 18-22 | Monday-Friday | Final examinations for Basic Colleges. |
| 25-30 | Monday-Saturday | Division A vacation. |

April 1991

| | | |
|----|-----------|---|
| 1 | Monday | Orientation and registration for transfer students, continuing freshmen, and returning upperclass students. |
| 2 | Tuesday | Registration, orientation, and course drop/add continues until noon. |
| 3 | Wednesday | Classes begin in Basic Colleges for spring quarter at 8 AM. |
| 15 | Monday | Patriots Day. University closed. |

May 1991

| | | |
|----|--------|----------------------------------|
| 27 | Monday | Memorial Day. University closed. |
|----|--------|----------------------------------|

June 1991

| | | |
|-------|---------------|---|
| 10-14 | Monday-Friday | Final examinations for Basic Colleges. |
| 15 | Saturday | Commencement. |
| 17-21 | Monday-Friday | Division B vacation. |
| 24 | Monday | Registration for Division A and D and January freshmen (Quarter 3). Beginning of summer quarter. |
| 25 | Tuesday | Basic College classes begin at 8 AM. |

July 1991

| | | |
|---|----------|--------------------------------------|
| 4 | Thursday | Independence Day. University closed. |
|---|----------|--------------------------------------|

September 1991

| | | |
|------|------------------|--|
| 2 | Monday | Labor Day. University closed. |
| 3-6 | Tuesday-Friday | Final examinations for Basic Colleges. |
| 9-18 | Monday-Wednesday | Division A vacation. |
| 12 | Thursday | Fall commencement. |
| 16 | Monday | Beginning of 1991-1992 academic year. Orientation week for new students. Registration and advising week for all returning upperclass students and all new students. |
| 23 | Monday | Classes begin for Basic Colleges for fall quarter at 8 AM. |

Calendar dates are subject to change. The University community will be notified if such changes are necessary.

University Registrations

| | | |
|--------------|--------------|----------|
| Winter 1991 | January 2 | Tuesday |
| Spring 1991 | April 1 | Monday |
| Summer 1991 | June 24 | Monday |
| Fall 1991 | | |
| New students | September 16 | Monday |
| Upperclass | September 19 | Thursday |

Course Registrations: Thursdays, 7:30 AM, Ell Ballroom

| | | |
|-------------|-------------|-----------------------|
| Winter 1991 | October 25 | Course registration 2 |
| Spring 1991 | November 8 | Course registration 1 |
| | January 24 | Course registration 2 |
| Summer 1991 | February 14 | Course registration 1 |
| | April 18 | Course registration 2 |
| Fall 1991 | May 9 | Course registration 1 |
| | July 25 | Course registration 2 |

Course Registrations: Drop/Add

| | |
|-------------|---------------------|
| Winter 1991 | November 13, 14 |
| | December 10, 11, 12 |
| Spring 1991 | November 26, 27 |
| | February 13 |
| | March 20, 21, 22 |
| Summer 1991 | March 6, 8 |
| | May 8, 10 |
| | June 12, 13, 14 |
| Fall 1991 | May 28, 29 |
| | September 4, 5, 6 |

Grades Deadline: All Grades Mailed the Following Day

| | |
|-------------|--------------|
| Winter 1991 | March 26 |
| Spring 1991 | June 18 |
| Summer 1991 | September 10 |
| Fall 1991 | December 16 |

Mission Statement

Northeastern University's mission, as a large urban university founded on the cooperative model of education, is to provide individuals with the opportunity for upward mobility through excellence in education. The University achieves its mission through curricula that value equally knowledge for its own sake, knowledge as a means to success in the workplace, and knowledge as a cornerstone of personal achievement and satisfaction.

Achieving Northeastern University's mission requires excellence in teaching, and teaching remains the central activity of Northeastern's faculty. By offering undergraduate and graduate programs that are rigorous, relevant, and rewarding, the University provides a solid structure for educational excellence. Northeastern University is also committed to the search for knowledge through the scholarly and artistic undertakings of its faculty and students.

A central mandate of Northeastern University is to offer students the opportunity to apply directly lessons of the classroom and laboratory to the workplace through cooperative education. For three quarters of a century, cooperative education has been the keystone of Northeastern's uniqueness. As an increasing percentage of the nation's population enters the workforce, and new technologies continue to change the nature of work, the University has re-dedicated itself to helping the cooperative plan keep pace with those changes.

Northeastern University is committed to serving the educational needs of a diverse student population in an amenable physical environment. The University believes that its mission can be achieved only if the student body is not limited by economic status, cultural or racial background, geographic origin, sex, or age. Northeastern has a long history of serving the educational needs of the nontraditional student, providing degree and nondegree programs for people whose circumstances prevent them from following the standard college regimen.

Looking beyond the confines of the campus, Northeastern University is determined to maintain and strengthen its reputation as a friend to the City of Boston and a partner of the Commonwealth of Massachusetts. The University's obligation to serve the community of which it is an integral part is fulfilled primarily through the educational enterprise. Through its numerous outreach programs, the University has made striking contributions to the community in the applied social sciences, in high technology, and in the arts. Northeastern University will continue to contribute in these and other ways to the region's overall quality of life and to its economic vitality.

Antidiscrimination Policy

Northeastern University is committed to a policy of equal opportunity for all students and employees without regard to race, color, religion, sex, sexual preference, national origin, or handicap, marital, or

veteran status. The University prohibits discrimination in all matters involving admission, registration, and all official relationships with students, including evaluation of academic performance.

Equal Opportunity Employment Policy

Northeastern University is an equal opportunity employer. It is institutional policy that there shall be no discrimination against any employee or applicant for employment because of race, color, religion, sex, age, sexual preference, national origin, or handicap, marital, or veteran status. Northeastern also prohibits discrimination against any employee regarding upgrading, demotion or transfer, layoff or termination, rates of pay or other forms of compensation, and selection for training. In addition, Northeastern adheres to Affirmative Action guidelines in all recruitment endeavors.

Further, Northeastern will not condone any forms of sexual harassment, which is defined as the use of unwelcome sexual advances, requests for favors, and other verbal or physical conduct of a sexual nature, as an explicit or implicit condition of employment, as the basis for employment decisions, or to interfere with an individual's work performance by creating an intimidating, hostile, or offensive work environment.

Inquiries concerning our equal opportunity policies may be referred to the University Title IX Coordinator/Compliance Officer for Section 504 of the Rehabilitation Act of 1973, Affirmative Action Office, Richards Hall. Telephone: 617-437-2133.

Accreditation Statement

Northeastern University is accredited by the New England Association of Schools and Colleges, Inc., which accredits schools and colleges in the six New England states. Accreditation by the Association indicates that the institution has been carefully evaluated and found to meet standards agreed upon by qualified educators.

Children's Center

Northeastern University operates a Children's Center in 123 Forsyth Building. The center is academically housed in the Boston-Bouvé College of Human Development Professions' Department of Curriculum and Instruction. Children from age 2 years and 9 months to 6 years are eligible. For further information, phone 617-437-3929.

Delivery of Services

The University assumes no liability, and hereby expressly negates the same, for failure to provide or delay in providing educational or related services or facilities or for any other failure or delay in performance arising out of or due to causes beyond the reasonable control of the University, which causes include, without limitation, power failure, fire, strikes by University employees or others, damage by the elements and acts of public authorities. The University will, however, exert reasonable efforts, when in its judgment it is appropriate to do so, to

provide comparable or substantially equivalent services, facilities or performance, but its inability or failure to do so shall not subject it to liability.

The Northeastern University catalog contains current information regarding the University calendar, admissions, degree requirements, fees, and regulations. Such information is not intended to be and should not be relied upon as a statement of the University's contractual undertakings.

Northeastern University reserves the right in its sole judgment to promulgate and change rules and regulations and to make changes of any nature in its program, calendar, admissions policies, procedures and standards, degree requirements, fees, and academic schedule whenever it is deemed necessary or desirable, including, without limitation, changes in course content, the rescheduling of classes, cancelling of scheduled classes and other academic activities, and requiring or affording alternatives for scheduled classes or other academic activities, in any such case giving such notice as is reasonably practicable under the circumstances.

Northeastern will do its best to make available to you the finest education, the most stimulating atmosphere, and the most congenial conditions it can provide. But the quality and rate of progress of your academic career are in large measure dependent upon your own abilities, commitment, and effort. This is equally true with respect to professional advancement upon completion of the degree or program in which you are enrolled. The University cannot guarantee that you will obtain or succeed at any particular job; that will depend upon your own skills, achievement, presentation, and other factors such as market conditions at that time. Similarly, in many professions and occupations there are increasing requirements imposed by federal and state statutes and regulatory agencies for certification or entry into a particular field. These may change during the period of time when you are at Northeastern and they may vary from state to state and from country to country. While the University stands ready to help you find out about these requirements and changes, it is your responsibility to initiate the inquiry because the University has no other way of knowing what your expectations and understandings are. In brief, the University is there to offer you educational opportunities and choices and to assist you in finding the

direction in which you want to steer your educational experience, but you are a partner in this venture with an obligation and responsibility to yourself.

Insufficient Enrollment Disclaimer

Northeastern reserves the right to cancel any course if minimum enrollments are not met.

Emergency Closing of the University

Northeastern University has made arrangements to notify students, faculty, and staff by radio when it becomes necessary to cancel classes because of extremely inclement weather. AM radio stations WBZ (1030), WEEI (590), WHDH (850), and WRKO (680) and FM stations WBCN (104.1) and WROR (98.5) are authorized to announce the University's decision to close. Since instructional television courses originate from live or broadcast facilities at the University, neither the classes nor the courier service operate when the University is closed.

Office of Services for the Handicapped

The Office of Services for the Handicapped (OSH) provides a variety of support services and general assistance to all of Northeastern's disabled students and employees. The University's efforts to comply with section 504 of the Rehabilitation Act of 1973 are coordinated by Ruth Bork, OSH director, 5 Ell Center, 617-437-2675 (TTY number is 437-2730).

Family Educational Rights and Privacy Act

In accordance with the Family Educational Rights and Privacy Act of 1974, Northeastern University permits its students to inspect their records wherever appropriate and to challenge specific parts of them when they feel it is necessary to do so. Specific details of the law as it applies to Northeastern are printed in the Student Handbook and are distributed annually at registrations of the University College and graduate schools.

Northeastern University charges tuition for all courses taken above the normal academic load. Tuition rates, all fees, rules and regulations, courses and course content are subject to revision by the President and the Board of Trustees at any time.

Northeastern
University Publications
02.90.03

Jesse Owens

Alexander Graham Bell

Jane Addams

Rosa Parks

Benjamin Franklin

George Washington

Geraldine Ferraro

Charlie Chaplin

Leonardo da Vinci

Amelia Earhart

Simone de Beauvoir

Albert Einstein

Neil Armstrong

Marian Anderson

Sandra Day O'Connor

Edgar Allan Poe

Mahatma Ghandi

Florence Nightingale

Martin Luther King

James Joyce

Immanuel Kant

Susan B. Anthony

Jane Austen

e.e. cummings

Sally Ride

Harriet Tubman

George Eliot

Edmund Hillary



School of Engineering Technology

Bulletin 1990–1992



**Northeastern
University**

**Northeastern
University**

**School of
Engineering Technology
Bulletin**

1990–1992

Contents

About This Bulletin

Teaching Tomorrow's Technologists Today 1

An Introduction to Engineering Technology 3

School of Engineering Technology 4

Degree Program Descriptions 5

Overview 5

Civil Engineering Technology Programs 5

Architectural Engineering Technology 6

Environmental Engineering Technology 7

Structural Engineering Technology 8

Surveying and Highway Engineering Technology 9

Mechanical-Structural Engineering Technology 10

Computer Technology Programs 12

Electrical Engineering Technology Programs 16

Energy Systems Program 20

Manufacturing Engineering Technology Program 22

Mechanical Engineering Technology Programs 24

Aerospace Maintenance Engineering Technology 28

Telecommunications Program 30

Course Descriptions 33

Overview 33

Civil Engineering Technology 34

Chemistry 35

Computer Technology 35

Economics 38

Electrical Engineering Technology 39

English 42

General Engineering Technology 42

Human Resources Management 43

Industrial Engineering Technology 43

Industrial Management 43

Mechanical Engineering Technology 44

Manufacturing Engineering Technology 47

Management 47

Management Science 48

Mathematics 48

Physics 49

Northeastern University 51

A Profile of Northeastern 52

Where You'll Find Northeastern 52

Network Northeastern 53

University Libraries 53

Engineering Computer Center 54

Division of Academic Computing 54

Ell Student Center 54

Sport, Dance, and Exercise Facilities 54

Social and Professional Clubs 55

Office of Services for the Handicapped 55

Counseling and Testing Center 55

Lane Health Center 55

Department of Career Development and Placement 56

Cooperative Plan of Education 56

Alumni Association 56

Administrative Information 57

Admissions 57

Registration 58

Academic Standards 60

Graduation Requirements 63

Academic and Professional Awards 63

Additional Opportunities at Northeastern 64

Financial Information 65

Tuition and Fees 65

Financial Aid and Scholarships 66

Appendix 69

Faculty 70

Administration 76

Governing Boards and Officers of the University 78

Campus Maps 84

About This Bulletin

This *Bulletin* offers information about the evening and weekend programs available at Northeastern University's School of Engineering Technology. (If you are interested in Northeastern University's full-time day programs, call the Office of Undergraduate Admissions, 617-437-2200.)

For prospective students, we hope that after reading this publication you'll agree that a career in engineering technology can be exciting and challenging. As you'll soon discover, our evening and weekend programs are designed to enable you to pursue a career and an education at the same time.

Students already attending the School of Engineering Technology use the *Bulletin* as an important guide to the resources and policies of the University. In addition, students use the degree program descriptions to plan and track their academic careers.

The *School of Engineering Technology Bulletin* is divided into two parts: "Teaching Tomorrow's Technologists Today" and "Northeastern University."

"Teaching Tomorrow's Technologists Today" defines engineering technology and introduces you to the School of Engineering Technology. This section also contains descriptions of each program and course we offer.

The "Northeastern University" section reviews the benefits—the services and resources—that attending the largest private university in the nation provides. We present the University's administrative and academic policies, as well as financial aid and scholarship opportunities.

Taking the Next Step

If you are planning to attend the School of Engineering Technology for the first time, please complete and return the enclosed Student Data

Card. The information on the card enables us to open a student file for you that can be used by the school's academic counseling staff whenever you request assistance.

Because we have an open enrollment policy, you can register for courses without formally applying for admittance to a program. In fact, our students earn sixteen credits before petitioning for entrance to a program. If you are a transfer student, you may already be eligible to matriculate. For more details, carefully review the "Admissions" section. (See page 57.)

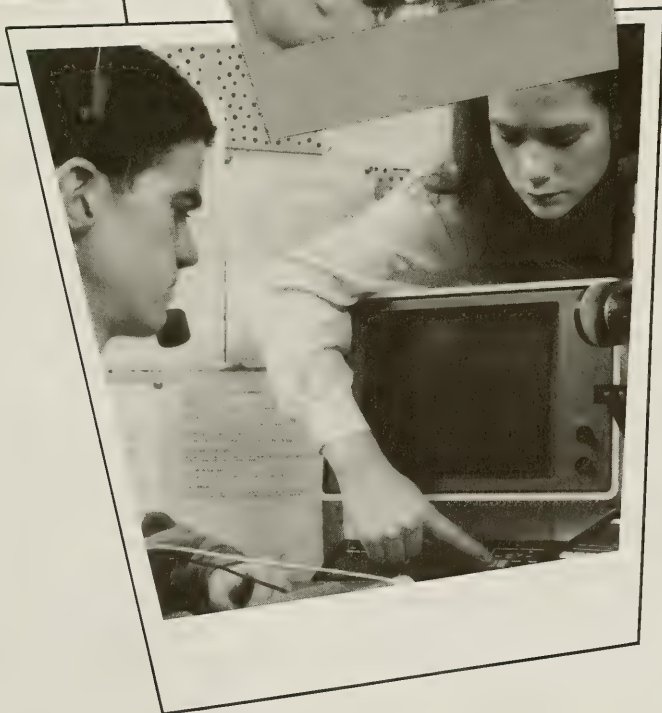
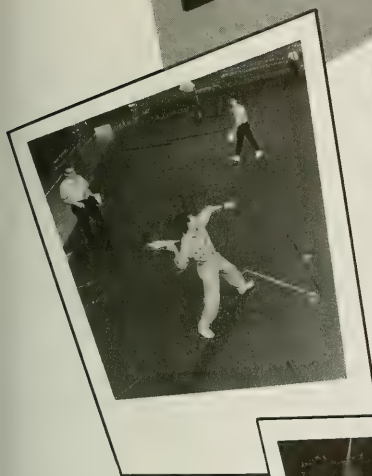
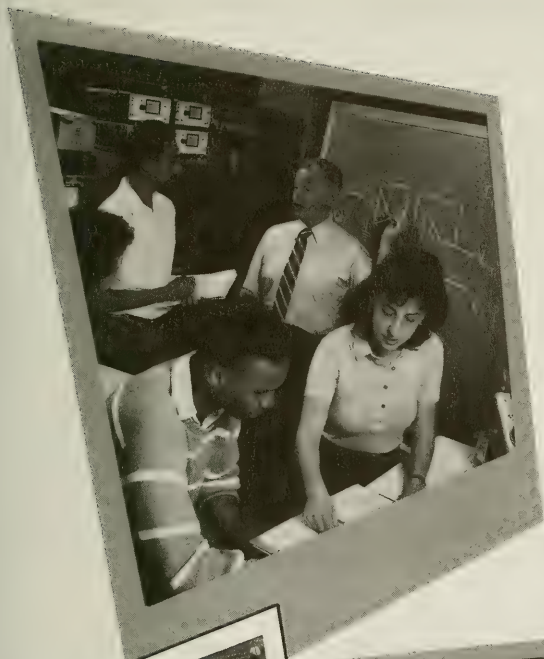
A Fee Schedule and Academic Calendar should have been enclosed with this *Bulletin*. The insert includes the current academic calendar, registration dates, and a list of the University's fees.

Before registration begins, obtain a copy of the *University College and School of Engineering Technology Schedule* for the next academic quarter. The *Schedule* indicates which courses will be offered each quarter, and when they will meet. Note that, since not all courses are offered every quarter, you must plan your course load for the coming academic year, not just the next quarter, by referring to the program and course descriptions contained in this *Bulletin*. For more details, review the "Registration" section. (See page 58.)

Finding Additional Help

If you have any questions, or are missing any of the forms mentioned in this *Bulletin*, call the School of Engineering Technology office, 617-437-2500.

Teaching Tomorrow's Technologists Today



An Introduction to Engineering Technology

Janet Lampke is a branch manager for Northrop's Precision Product Division. Steve Sweeney is chair and chief executive officer of the Boston Edison Company. Susan Jenkins is a technical trainer for Unitrode. David Varney is a senior project engineer for Texas Instruments.

At first glance, you may not think these professionals have a lot in common. However, the exact opposite is true: they have all built exciting careers from degrees in engineering technology.

What is engineering technology?

Engineering technology is the application of engineering principles and modern technology to help solve or prevent technical problems. Unlike engineering, which is primarily analytical and theoretical, engineering technology centers on practical applications.

Engineering technology is a relatively new discipline. Before engineering technology programs like Northeastern's emerged, people with scientific or technical ambitions had a difficult decision to make: what kind of education should they pursue? College-bound students had three choices.

Choice number one was selecting a major from among the pure sciences: physics, chemistry, or biology. However, these majors are only appropriate for people interested in pursuing additional degrees, laboratory research, or careers in education.

The second option was selecting from among the engineering science majors: civil engineering, electrical engineering, or mechanical engineering. But engineering science demands highly developed analytical skills, and prepares people for careers conceptualizing and designing technical devices or systems.

The third choice was deciding not to attend college, but to enroll in a technical or vocational school. This route is best suited for people interested in the trades: that is, for people who want careers physically building or repairing machinery.

Engineering technology curricula introduced a fourth option. The programs are designed to meet the growing need created by our technolog-

ical revolution for college-educated problem solvers who can bridge the gap between the blueprints and the production line. These men and women can help engineers and tradespeople work effectively together.

Engineering technology programs include scientific and engineering principles relevant to your chosen field: you will come to understand why a system is designed in a particular fashion and how it works. This educational focus is often absent from a technical or vocational school education.

In addition, engineering technology students acquire hands-on technical skills, an element given little emphasis in engineering science curricula. These technical skills will enable you to solve production and system implementation problems, and help you to explain your solutions to tradespeople.

Who are engineering technologists?

People who are part of the technology workplace include scientists, engineers, technologists, technicians, and tradespeople. All of these professionals have specialized educations or training beyond the high school level, and often have to work together as a team. As on any team, the players have different roles that are equally important.

Scientists are concerned with advancing our understanding of the laws of nature and our knowledge of scientific principles. The scientist is primarily involved with research.

Engineers employ the scientific knowledge developed by scientists in planning, designing, and constructing technical devices and systems. The engineer is a developer of technological innovations.

Engineering technologists work closely with engineers in coordinating people, material, and machinery in order to achieve the specific goals of a particular project. The engineering technologist often ensures that the engineer's designs and instructions are implemented efficiently and according to accepted practices.

School of Engineering Technology

You have a special kind of ambition that allows you to work full-time and attend University after hours. The faculty and administration of the School of Engineering Technology share, admire, and respect your desire for professional and personal growth through higher education. We are as committed as you. We can help you achieve your goals.

When you enroll in the School of Engineering Technology, you are entering one of the oldest and finest undergraduate engineering technology programs in the country. Northeastern University established its first engineering technology program within the Polytechnic School in 1916. During 1926, the program was reorganized under a new entity within Northeastern: Lincoln Institute, later changed to Lincoln College. The program's most recent transformation occurred in 1984, when Lincoln College became the School of Engineering Technology.

Today's School of Engineering Technology is a unit of Northeastern University's College of Engineering. Although we offer courses at several locations and through the University's television system, Network Northeastern, our central offices are in the Snell Engineering Center on the Boston campus.

All of our engineering technology programs require laboratory courses that are conducted in facilities on the Boston campus. We've done our best to ensure that you can get the most out of these courses by equipping our laboratories with the latest available technology. We continue to acquire laboratory equipment that allows us to conduct experiments that were until recently impractical or impossible.

As a student at Northeastern's School of Engineering Technology, you are taught by faculty whose impressive professional experience can provide you with practical insights into the field.

In addition to the many resources offered to you as a School of Engineering Technology student, you are a fully vested member of the Northeastern University community. As such, you are invited to take advantage of the many assets the University provides. We encourage you to

read the "Profile of Northeastern" section of this *Bulletin* for details of the University's facilities.

The School of Engineering Technology offers day programs in engineering technology to full-time students, as well as the evening and weekend programs described in this publication. All of our programs are at the undergraduate level, leading to either an associate's or a bachelor's degree.

Our fifteen evening and weekend degree programs span the following areas of concentration.

- Civil engineering technology, including architectural; environmental; structural; surveying and highway; and mechanical-structural engineering technology
- Computer technology
- Electrical engineering technology
- Energy systems
- Manufacturing engineering technology
- Mechanical engineering technology, including aerospace maintenance engineering technology
- Telecommunications

We welcome your interest in Northeastern's School of Engineering Technology. In the following pages, you can learn about the specifics of each of our programs.

Degree Program Descriptions

Overview

This section gives a description of each program offered by the School of Engineering Technology. Accompanying each description are specimen curricula for the majors offered within the specific program. The specimens list the degree's required courses and the sequence in which you should complete them. The specimens assume that you will initially enroll in courses during the fall quarter. If you are a transfer student, take time off, or begin the program in a different quarter, please meet with one of our academic advisers. The adviser will help you take courses in a sequence that is academically sound and that will fulfill your degree program's graduation requirements. For more information about the program descriptions and curricula, contact an adviser at 617-437-2500.

Civil Engineering Technology Programs

Civil engineering professionals plan and construct a variety of structures and public works. The civil engineering technologist's major functions include preparing surveys (topographical, geological, traffic); designing structures (buildings, bridges, dams); planning municipal systems (water, sewers, flood control); and developing transportation facilities (highways, railways, waterways).

We offer associate's degree programs in architectural engineering technology; environmental engineering technology; structural engineering technology; and surveying and highway engineering technology. A bachelor's degree program in mechanical-structural engineering technology is also offered.

The associate's degree program in architectural engineering technology offers study in planning, designing, and constructing buildings.

Career opportunities are with architectural groups, consulting engineering firms, and government agencies.

The associate's degree program in environmental engineering technology offers you the opportunity to prepare for responsibilities related to designing, constructing, and supervising municipal plants and systems that control the storage and distribution of water. Students may also prepare for responsibilities associated with the disposal of sewage and waste in urban areas, with an emphasis on preventing contamination and pollution. Career opportunities are with town, city, and state public works departments, private engineering consultants, architects, contractors, and engineering firms.

The associate's degree program in structural engineering technology offers the opportunity to prepare for planning, designing, and supervising the construction of buildings, bridges, foundations, flood-control projects, and other fixed structures. Professional opportunities include consulting engineering firms, architectural groups, contractors, railroads, government agencies, and the military.

The associate's degree program in surveying and highway engineering technology offers opportunities in the preparation and calculation of preliminary and legal surveys required for both basic and complex projects. These projects can include subdivision work, individual lot layouts, highway layouts, and projects relating to sewer systems, pipelines, power transmission lines, dams, reservoirs, and aqueducts. Career opportunities are with independent surveying companies, civil engineering companies, highway transit, railroad planning groups, cartographers, construction companies, and contractors.

The bachelor's degree program in mechanical-structural engineering technology offers opportunities to prepare for both the planning and constructing of structures such as buildings, bridges, and docks, and designing and producing dynamic machine tools, machinery, and other mechanical devices. Career opportunities are with architectural, construction, civil, and mechanical professions and companies.

Architectural Engineering Technology

(Major Code 025)

The Architectural Engineering Technology Program leads to the associate in engineering degree. Degree candidates must

earn 102 credits by completing the following four-year curriculum.

| | | | | |
|---------------------|--------|-----|------|---|
| First-Year Courses | Fall | GET | 4170 | Engineering Graphics 1 |
| | | MTH | 4107 | College Algebra |
| | Winter | GET | 4171 | Engineering Graphics 2 |
| | | MTH | 4108 | Pre-Calculus |
| | Spring | GET | 4100 | Computer Programming for Engineering Technology |
| | | MTH | 4120 | Calculus 1 |
| Second-Year Courses | Fall | MTH | 4121 | Calculus 2 |
| | | PHY | 4117 | Physics 1 |
| | Winter | ENG | 4110 | Critical Writing 1 |
| | | PHY | 4118 | Physics 2 |
| | | PHY | 4173 | Physics Lab 1 |
| | Spring | GET | 4306 | Technical Communications |
| | | PHY | 4119 | Physics 3 |
| | | PHY | 4174 | Physics Lab 2 |
| Third-Year Courses | Fall | CHM | 4111 | General Chemistry 1 |
| | | ECN | 4115 | Economic Principles and Problems 1 |
| | | MET | 4301 | Mechanics A |
| | Winter | ECN | 4116 | Economic Principles and Problems 2 |
| | | ENG | 4111 | Critical Writing 2 |
| | | MET | 4314 | Stress Analysis A |
| | Spring | CET | 4321 | Introduction to Structural Design |
| | | MET | 4315 | Stress Analysis B |
| Fourth-Year Courses | Fall | CET | 4324 | Structural Analysis 1 |
| | | CET | 4390 | Technology of Modern Architecture |
| | Winter | CET | 4371 | Concrete Design 1 |
| | | CET | 4391 | Architectural Design 1 |
| | Spring | CET | 4331 | Steel Design 1 |
| | | CET | 4392 | Architectural Design 2 |

Environmental Engineering Technology

(Major Code 011)

The Environmental Engineering Technology Program leads to the associate in engineering degree. Degree candidates must

earn 102 credits by completing the following four-year curriculum.

| | | | | |
|----------------------------|---------------|-----|------|---|
| First-Year Courses | <i>Fall</i> | GET | 4170 | Engineering Graphics 1 |
| | | MTH | 4107 | College Algebra |
| | <i>Winter</i> | GET | 4171 | Engineering Graphics 2 |
| | | MTH | 4108 | Pre-Calculus |
| | <i>Spring</i> | GET | 4100 | Computer Programming for Engineering Technology |
| | | MTH | 4120 | Calculus 1 |
| Second-Year Courses | <i>Fall</i> | MTH | 4121 | Calculus 2 |
| | | PHY | 4117 | Physics 1 |
| | <i>Winter</i> | ENG | 4110 | Critical Writing 1 |
| | | PHY | 4118 | Physics 2 |
| | | PHY | 4173 | Physics Lab 1 |
| | <i>Spring</i> | GET | 4306 | Technical Communications |
| | | PHY | 4119 | Physics 3 |
| | | PHY | 4174 | Physics Lab 2 |
| Third-Year Courses | <i>Fall</i> | CHM | 4111 | General Chemistry 1 |
| | | ECN | 4115 | Economic Principles and Problems 1 |
| | | MET | 4301 | Mechanics A |
| | <i>Winter</i> | ECN | 4116 | Economic Principles and Problems 2 |
| | | ENG | 4111 | Critical Writing 2 |
| | | MET | 4314 | Stress Analysis A |
| | <i>Spring</i> | MET | 4315 | Stress Analysis B |
| | | MET | 4370 | Fluid Mechanics A |
| Fourth-Year Courses | <i>Fall</i> | CET | 4324 | Structural Analysis 1 |
| | | CET | 4361 | Materials and Soil Mechanics |
| | <i>Winter</i> | CET | 4350 | Environmental 1 |
| | | CET | 4371 | Concrete Design 1 |
| | <i>Spring</i> | CET | 4351 | Environmental 2 |
| | | CET | 4393 | Construction Administration |

Structural Engineering Technology (Major Code 012)

The Structural Engineering Technology Program leads to the associate in engineering degree.

Degree candidates must earn 102 credits by completing the following four-year curriculum.

| | | | | |
|---------------------|--------|-----|------|---|
| First-Year Courses | Fall | GET | 4170 | Engineering Graphics 1 |
| | | MTH | 4107 | College Algebra |
| | Winter | GET | 4171 | Engineering Graphics 2 |
| | | MTH | 4108 | Pre-Calculus |
| | Spring | GET | 4100 | Computer Programming for Engineering Technology |
| | | MTH | 4120 | Calculus 1 |
| Second-Year Courses | Fall | MTH | 4121 | Calculus 2 |
| | | PHY | 4117 | Physics 1 |
| | Winter | ENG | 4110 | Critical Writing 1 |
| | | PHY | 4118 | Physics 2 |
| | | PHY | 4173 | Physics Lab 1 |
| | Spring | GET | 4306 | Technical Communications |
| | | PHY | 4119 | Physics 3 |
| | | PHY | 4174 | Physics Lab 2 |
| Third-Year Courses | Fall | CHM | 4111 | General Chemistry 1 |
| | | ECN | 4115 | Economic Principles and Problems 1 |
| | | MET | 4301 | Mechanics A |
| | Winter | ECN | 4116 | Economic Principles and Problems 2 |
| | | ENG | 4111 | Critical Writing 2 |
| | | MET | 4314 | Stress Analysis A |
| | Spring | CET | 4321 | Introduction to Structural Design |
| | | MET | 4315 | Stress Analysis B |
| Fourth-Year Courses | Fall | CET | 4324 | Structural Analysis 1 |
| | | CET | 4361 | Materials and Soil Mechanics |
| | Winter | CET | 4325 | Structural Analysis 2 |
| | | CET | 4371 | Concrete Design 1 |
| | Spring | CET | 4331 | Steel Design 1 |
| | | CET | 4393 | Construction Administration |

Surveying and Highway Engineering Technology (Major Code 013)

The Surveying and Highway Engineering Technology Program leads to the associate in engineering degree. Degree candidates must

earn 102 credits by completing the following four-year curriculum.

First-Year Courses

| | | | |
|---------------|-----|------|---|
| <i>Fall</i> | GET | 4170 | Engineering Graphics 1 |
| | MTH | 4107 | College Algebra |
| <i>Winter</i> | GET | 4171 | Engineering Graphics 2 |
| | MTH | 4108 | Pre-Calculus |
| <i>Spring</i> | GET | 4100 | Computer Programming for Engineering Technology |
| | MTH | 4120 | Calculus 1 |

Second-Year Courses

| | | | |
|---------------|-----|------|--------------------------|
| <i>Fall</i> | MTH | 4121 | Calculus 2 |
| | PHY | 4117 | Physics 1 |
| <i>Winter</i> | ENG | 4110 | Critical Writing 1 |
| | PHY | 4118 | Physics 2 |
| | PHY | 4173 | Physics Lab 1 |
| <i>Spring</i> | GET | 4306 | Technical Communications |
| | PHY | 4119 | Physics 3 |
| | PHY | 4174 | Physics Lab 2 |

Third-Year Courses

| | | | |
|---------------|-----|------|------------------------------------|
| <i>Fall</i> | CHM | 4111 | General Chemistry 1 |
| | ECN | 4115 | Economic Principles and Problems 1 |
| | MET | 4301 | Mechanics A |
| <i>Winter</i> | ECN | 4116 | Economic Principles and Problems 2 |
| | ENG | 4111 | Critical Writing 2 |
| | MET | 4314 | Stress Analysis A |
| <i>Spring</i> | MET | 4315 | Stress Analysis B |
| | MET | 4370 | Fluid Mechanics A |

Fourth-Year Courses

| | | | |
|---------------|-----|------|----------------------------|
| <i>Fall</i> | CET | 4301 | Plane Surveying |
| | CET | 4316 | Land Use Planning |
| <i>Winter</i> | CET | 4302 | Geodetic Surveying |
| | CET | 4307 | Legal Aspects of Surveying |
| <i>Spring</i> | CET | 4303 | Route Surveying |
| | CET | 4311 | Highway Engineering |

**Mechanical-Structural Engineering
Technology** (Major Code 015)

The Mechanical-Structural Engineering Technology Program leads to the bachelor of engineering technology degree. The program is accredited by the Technology Accreditation

Commission of the Accreditation Board for Engineering and Technology. Degree candidates must earn at least 186 credits by completing the following seven-year curriculum.

| | | | | |
|---------------------|--------|-----|------|---|
| First-Year Courses | Fall | GET | 4170 | Engineering Graphics 1 |
| | | MTH | 4107 | College Algebra |
| | Winter | GET | 4171 | Engineering Graphics 2 |
| | | MTH | 4108 | Pre-Calculus |
| | Spring | GET | 4100 | Computer Programming for Engineering Technology |
| | | MTH | 4120 | Calculus 1 |
| Second-Year Courses | Fall | MTH | 4121 | Calculus 2 |
| | | PHY | 4117 | Physics 1 |
| | Winter | ENG | 4110 | Critical Writing 1 |
| | | PHY | 4118 | Physics 2 |
| | | PHY | 4173 | Physics Lab 1 |
| | Spring | GET | 4306 | Technical Communications |
| | | PHY | 4119 | Physics 3 |
| | | PHY | 4174 | Physics Lab 2 |
| Third-Year Courses | Fall | CHM | 4111 | General Chemistry 1 |
| | | MET | 4301 | Mechanics A |
| | | MTH | 4122 | Calculus 3 |
| | Winter | MET | 4302 | Mechanics B |
| | | MET | 4314 | Stress Analysis A |
| | Spring | MET | 4370 | Fluid Mechanics A |
| | | MET | 4380 | Materials A |
| Fourth-Year Courses | Fall | ECN | 4115 | Economic Principles and Problems 1 |
| | | MET | 4315 | Stress Analysis B |
| | | MET | 4390 | Measurement and Analysis Lab |
| | Winter | ENG | 4111 | Critical Writing 2 |
| | | MET | 4371 | Fluid Mechanics B |
| | | MET | 4391 | Technology Lab A |
| | Spring | CET | 4321 | Introduction to Structural Design |
| | | MET | 4392 | Technology Lab B |
| | | (|) | Social Science/Humanities Elective |

Fifth-Year Courses

| | | | |
|---------------|----------------|------|-----------------------|
| <i>Fall</i> | CET | 4324 | Structural Analysis 1 |
| | MET | 4303 | Mechanics C |
| <i>Winter</i> | CET | 4325 | Structural Analysis 2 |
| | () | | Technical Elective |
| <i>Spring</i> | CET | 4331 | Steel Design 1 |
| | () | | Technical Elective |

Sixth-Year Courses

| | | | |
|---------------|----------------|------|------------------------------------|
| <i>Fall</i> | CET | 4332 | Steel Design 2 |
| | () | | Social Science/Humanities Elective |
| | () | | Social Science/Humanities Elective |
| <i>Winter</i> | CET | 4371 | Concrete Design 1 |
| | () | | Social Science/Humanities Elective |
| | () | | Technical Elective |
| <i>Spring</i> | CET | 4372 | Concrete Design 2 |
| | () | | Technical Elective |

Seventh-Year Courses

| | | | |
|---------------|----------------|--------|------------------------------------|
| <i>Fall</i> | SPC | () | Communication Elective |
| | () | | Social Science/Humanities Elective |
| | () | | Technical Elective |
| <i>Winter</i> | MET | 4330 | Mechanical Design A |
| | SPC | () | Communication Elective |
| | () | | Lab Elective |
| <i>Spring</i> | MET | 4331 | Mechanical Design B |
| | () | | Open Elective |
| | () | | Social Science/Humanities Elective |

Suggested Technical Electives

| | | |
|-----|------|--|
| CET | 4301 | Plane Surveying |
| CET | 4302 | Geodetic Surveying |
| CET | 4303 | Route Surveying |
| CET | 4311 | Highway Engineering |
| CET | 4361 | Materials and Soil Mechanics |
| CET | 4393 | Construction Administration |
| IIS | 4393 | Engineering Probability and Statistics |
| MET | 4340 | Thermodynamics A |
| MET | 4414 | Mechanical Vibrations |
| MET | 4415 | Experimental Stress Analysis |
| MET | 4416 | Stress Analysis C |
| MET | 4481 | Materials B |
| MET | 4482 | Applied Metallurgy |

Computer Technology Programs

The computer technology professional's work relates to the design and use of computer system hardware and software. Areas of study include the design and architecture of the computer system; software issues include the methodology and application of problem solving and the utilization of hardware.

We offer both an associate's and a bachelor's degree program in computer technology.

The associate's degree program in computer technology offers you the opportunity to understand the mathematical and technological foundations of both hardware and software. In addition to providing a more thorough

study of hardware and software, the bachelor's degree program gives you the opportunity to specialize in a specific area through five required technical electives.

Career opportunities may include computer programming for engineering, science, and business. Additional employment opportunities concern designing, engineering, and testing of computers; and interfacing computers with various types of equipment used in automation. Associate's degree graduates may qualify for entry-level positions in the areas listed, while bachelor's degree graduates may secure employment with more responsibility.

Computer Technology (Major Code 036)

The Computer Technology Program leads to the associate in engineering degree. Degree candidates must earn 100 credits by completing the following four-year curriculum.

| | | | | | |
|---------------------|--------------------|----------------|------------------------------------|------------------------------|---------------------------------|
| First-Year Courses | Fall | CT | 4105 | Pascal/Algorithms | |
| | | MTH | 4107 | College Algebra | |
| | Winter | CT | 4150 | Computer Organization | |
| | | MTH | 4108 | Pre-Calculus | |
| | Spring | GET | 4170 | Engineering Graphics 1 | |
| | | MTH | 4120 | Calculus 1 | |
| Second-Year Courses | Fall | MTH | 4121 | Calculus 2 | |
| | | PHY | 4117 | Physics 1 | |
| | Winter | ENG | 4110 | Critical Writing 1 | |
| | | PHY | 4118 | Physics 2 | |
| | | PHY | 4173 | Physics Lab 1 | |
| | Spring | GET | 4306 | Technical Communications | |
| | | PHY | 4119 | Physics 3 | |
| | | PHY | 4174 | Physics Lab 2 | |
| | Third-Year Courses | Fall | EET | 4151 | Circuit Analysis 1 |
| MTH | | | 4122 | Calculus 3 | |
| Winter | | CT | 4310 | FORTTRAN/File Processing | |
| | | EET | 4152 | Circuit Analysis 2 | |
| Spring | | EET | 4311 | Electronics 1 | |
| | | ENG | 4111 | Critical Writing 2 | |
| Fourth-Year Courses | | Fall | CT | 4311 | Programming with the C Language |
| | | | CT | 4368 | Semiconductor Logic |
| | Winter | CT | 4345 | Assembly Language | |
| | | CT | 4369 | Computer Logic | |
| | Spring | CT | 4330 | Data Structures | |
| | | CT | 4374 | Introduction to CPU Hardware | |
| | | () | Social Science/Humanities Elective | | |

Computer Technology (Major Code 037)

The Computer Technology Program leads to the bachelor of engineering technology degree. Degree candidates must earn at least 183 credits by completing the following seven-year curriculum.

| | | | | |
|---------------------|--------|-----|------|------------------------------------|
| First-Year Courses | Fall | CT | 4105 | Pascal/Algorithms |
| | | MTH | 4107 | College Algebra |
| | Winter | CT | 4150 | Computer Organization |
| | | MTH | 4108 | Pre-Calculus |
| | Spring | GET | 4170 | Engineering Graphics 1 |
| | | MTH | 4120 | Calculus 1 |
| Second-Year Courses | Fall | MTH | 4121 | Calculus 2 |
| | | PHY | 4117 | Physics 1 |
| | Winter | ENG | 4110 | Critical Writing 1 |
| | | PHY | 4118 | Physics 2 |
| | | PHY | 4173 | Physics Lab 1 |
| | Spring | GET | 4306 | Technical Communications |
| | | PHY | 4119 | Physics 3 |
| | | PHY | 4174 | Physics Lab 2 |
| Third-Year Courses | Fall | EET | 4151 | Circuit Analysis 1 |
| | | MTH | 4122 | Calculus 3 |
| | Winter | CT | 4310 | FORTTRAN/File Processing |
| | | EET | 4152 | Circuit Analysis 2 |
| | Spring | CT | 4335 | Numerical Methods |
| | | EET | 4311 | Electronics 1 |
| Fourth-Year Courses | Fall | CT | 4368 | Semiconductor Logic |
| | | ENG | 4111 | Critical Writing 2 |
| | | (|) | Social Science/Humanities Elective |
| | Winter | CT | 4345 | Assembly Language |
| | | CT | 4369 | Computer Logic |
| | Spring | CT | 4374 | Introduction to CPU Hardware |
| | | (|) | Social Science/Humanities Elective |

Fifth-Year Courses

| | | | |
|---------------|-----|------|------------------------------------|
| <i>Fall</i> | CT | 4311 | Programming with the C Language |
| | CT | 4375 | CPU Architecture |
| <i>Winter</i> | CT | 4330 | Data Structures |
| | (|) | Social Science/Humanities Elective |
| | (|) | Technical Elective |
| <i>Spring</i> | CT | 4355 | Micro Peripheral Hardware |
| | ECN | 4115 | Economic Principles and Problems 1 |
| | (|) | Social Science/Humanities Elective |

Sixth-Year Courses

| | | | |
|---------------|----|------|------------------------------------|
| <i>Fall</i> | CT | 4356 | Complex Peripheral Hardware |
| | (|) | Technical Elective |
| <i>Winter</i> | CT | 4340 | Software Engineering Design |
| | CT | 4351 | Advanced Computer Organization |
| <i>Spring</i> | CT | 4380 | Data Communication Methods |
| | (|) | Social Science/Humanities Elective |
| | (|) | Social Science/Humanities Elective |

Seventh-Year Courses

| | | | |
|---------------|----|------|------------------------------------|
| <i>Fall</i> | CT | 4360 | Industry Software |
| | (|) | Open Elective |
| | (|) | Technical Elective |
| <i>Winter</i> | CT | 4365 | Industry Hardware |
| | (|) | Technical Elective |
| <i>Spring</i> | (|) | Social Science/Humanities Elective |
| | (|) | Social Science/Humanities Elective |
| | (|) | Technical Elective |

Suggested Technical Electives

| | | |
|----|------|--|
| CT | 4321 | Programming with Ada |
| CT | 4348 | LISP |
| CT | 4363 | Concurrent Programming |
| CT | 4377 | VLSI Design |
| CT | 4379 | Computer Networks |
| CT | 4381 | Operating Systems |
| CT | 4382 | Computer Graphics Programming |
| CT | 4383 | Database |
| CT | 4384 | Large System Assembly Languages |
| CT | 4385 | Introduction to Simulation Programming |
| CT | 4387 | Bit Slice Microcomputers |
| CT | 4389 | Single-Chip Microprocessors |
| CT | 4390 | Special Problems in Computer Technology |
| CT | 4393 | UNIX Operating System |
| CT | 4394 | Object Oriented Programming |
| CT | 4395 | Computer Security |
| CT | 4396 | PROLOG: An Introduction to Artificial Intelligence |

Electrical Engineering Technology Programs

Electrical engineering technologists consider the design and operation of equipment and systems related to communications, data processing, electrical control, and power. In the power utility field, for example, the electrical engineering technologist is responsible for the generation, transmission, and distribution of electricity for light and power.

We offer both an associate's and a bachelor's degree program in electrical engineering technology.

The associate's degree program in electrical engineering technology relates to the design, development, and operation of communications, data processing, and electronic control equipment. The equipment is applied to computers, military and space explorations, and automated industrial production equipment. The bachelor's

degree program, in addition, relates to the installation and production of a variety of electrical and electronic equipment. Fields in which such equipment is applied include communications, data processing, industry, and in generating and utilizing electricity.

Career opportunities for associate's degree graduates include entry-level positions related to communications and electrical equipment, equipment manufacturing, and data processing and control. Career opportunities for bachelor's degree graduates are in public and private research laboratories; engineering consulting firms specializing in industrial and plant applications; electric utilities; and organizations concerned with the operation, manufacture, installation, or sale of electrical or electronic systems and equipment.

Electrical Engineering Technology (Major Code 033)

The Electrical Engineering Technology Program leads to the associate in engineering degree. The program is accredited by the Technology Accreditation Commission of the Accreditation

Board for Engineering and Technology. Degree candidates must earn at least 105 credits by completing the following four-year curriculum.

| | | | | |
|----------------------------|---------------|-----|------|---|
| First-Year Courses | <i>Fall</i> | GET | 4170 | Engineering Graphics 1 |
| | | MTH | 4107 | College Algebra |
| | <i>Winter</i> | GET | 4172 | Electrical Engineering Graphics |
| | | MTH | 4108 | Pre-Calculus |
| | <i>Spring</i> | GET | 4100 | Computer Programming for Engineering Technology |
| | | MTH | 4120 | Calculus 1 |
| Second-Year Courses | <i>Fall</i> | MTH | 4121 | Calculus 2 |
| | | PHY | 4117 | Physics 1 |
| | <i>Winter</i> | ENG | 4110 | Critical Writing 1 |
| | | PHY | 4118 | Physics 2 |
| | | PHY | 4173 | Physics Lab 1 |
| | <i>Spring</i> | GET | 4306 | Technical Communications |
| | | PHY | 4119 | Physics 3 |
| | | PHY | 4174 | Physics Lab 2 |
| Third-Year Courses | <i>Fall</i> | EET | 4151 | Circuit Analysis 1 |
| | | MTH | 4122 | Calculus 3 |
| | <i>Winter</i> | EET | 4124 | Circuits Lab 1 |
| | | EET | 4152 | Circuit Analysis 2 |
| | | MTH | 4123 | Differential Equations* |
| | <i>Spring</i> | EET | 4125 | Circuits Lab 2 |
| | | ENG | 4111 | Critical Writing 2 |
| | | (|) | Social Science/Humanities Elective |
| Fourth-Year Courses | <i>Fall</i> | EET | 4311 | Electronics 1 |
| | | EET | 4353 | Circuit Analysis 3* |
| | | (|) | Social Science/Humanities Elective |
| | <i>Winter</i> | EET | 4312 | Electronics 2 |
| | | EET | 4354 | Circuit Analysis 4* |
| | <i>Spring</i> | EET | 4310 | Electrical Measurements |
| | | EET | 4313 | Electronics 3 |
| | | EET | 4323 | Electronics Lab |

*Students not planning to enter a bachelor's degree program after graduation can substitute a social science/humanities elective for MTH 4123 Differential Equations; EET 4314 Pulse and Digital 1 for EET 4353 Circuit Analysis 3; and an approved technical elective for EET 4354 Circuit Analysis 4.

Electrical Engineering Technology

(Major Code 035)

The Electrical Engineering Technology Program leads to the bachelor of engineering technology degree. The program is accredited by the Technology Accreditation Commission of the

Accreditation Board for Engineering and Technology. Degree candidates must earn at least 186 credits by completing the following seven-year curriculum.

| | | | | |
|---------------------|--------|-----|------|---|
| First-Year Courses | Fall | GET | 4170 | Engineering Graphics 1 |
| | | MTH | 4107 | College Algebra |
| | Winter | GET | 4172 | Electrical Engineering Graphics |
| | | MTH | 4108 | Pre-Calculus |
| | Spring | GET | 4100 | Computer Programming for Engineering Technology |
| | | MTH | 4120 | Calculus 1 |
| Second-Year Courses | Fall | MTH | 4121 | Calculus 2 |
| | | PHY | 4117 | Physics 1 |
| | Winter | ENG | 4110 | Critical Writing 1 |
| | | PHY | 4118 | Physics 2 |
| | | PHY | 4173 | Physics Lab 1 |
| | Spring | GET | 4306 | Technical Communications |
| | | PHY | 4119 | Physics 3 |
| | | PHY | 4174 | Physics Lab 2 |
| Third-Year Courses | Fall | EET | 4151 | Circuit Analysis 1 |
| | | MTH | 4122 | Calculus 3 |
| | Winter | EET | 4124 | Circuits Lab 1 |
| | | EET | 4152 | Circuit Analysis 2 |
| | | MTH | 4123 | Differential Equations |
| | Spring | EET | 4125 | Circuits Lab 2 |
| | | ENG | 4111 | Critical Writing 2 |
| | | (|) | Social Science/Humanities Elective |
| Fourth-Year Courses | Fall | EET | 4311 | Electronics 1 |
| | | EET | 4353 | Circuit Analysis 3 |
| | | (|) | Social Science/Humanities Elective |
| | Winter | EET | 4312 | Electronics 2 |
| | | EET | 4354 | Circuit Analysis 4 |
| | Spring | EET | 4310 | Electrical Measurements |
| | | EET | 4313 | Electronics 3 |
| | | EET | 4323 | Electronics Lab |

| | | | | |
|-------------------------------|----------------------|------|---|------------------------------------|
| Fifth-Year Courses | Fall | EET | 4314 | Pulse and Digital 1 |
| | | EET | 4327 | Advanced Electronics Lab 1* |
| | | SPC | () | Communication Elective |
| | Winter | EET | 4328 | Advanced Electronics Lab 2* |
| | | EET | () | Technical Elective |
| | | SPC | () | Communication Elective |
| | Spring | EET | 4329 | Advanced Electronics Lab 3* |
| | | EET | 4330 | Energy Conversion |
| | | MET | 4319 | Mechanics |
| Sixth-Year Courses | Fall | EET | 4370 | Digital Computers 1 |
| | | () | | Open Elective |
| | | () | | Social Science/Humanities Elective |
| | Winter | EET | 4371 | Digital Computers 2 |
| | | () | | Social Science/Humanities Elective |
| | | () | | Social Science/Humanities Elective |
| | Spring | EET | 4337 | Distributed Systems |
| | | EET | () | Technical Elective |
| | Seventh-Year Courses | Fall | EET | () |
| () | | | | Social Science/Humanities Elective |
| Winter | | EET | 4377 | Control Engineering 1 |
| | | EET | () | Technical Elective |
| | | () | | Social Science/Humanities Elective |
| Spring | | EET | 4378 | Control Engineering 2 |
| | | () | | Social Science/Humanities Elective |
| Suggested Technical Electives | CT | 4311 | Programming with the C Language | |
| | CT | 4374 | Introduction to CPU Hardware | |
| | CT | 4375 | CPU Architecture | |
| | EET | 4315 | Pulse and Digital 2 | |
| | EET | 4317 | Principles of Communication Systems 1 | |
| | EET | 4318 | Principles of Communication Systems 2 | |
| | EET | 4319 | Principles of Communication Systems 3 | |
| | EET | 4360 | Photovoltaic Technology | |
| | EET | 4362 | Basic Power Systems 1 | |
| | EET | 4363 | Basic Power Systems 2 | |
| | EET | 4364 | Basic Power Systems 3 | |
| | EET | 4391 | Basic Optics and Optical Systems Design | |
| | EET | 4392 | Optoelectronics and Fiber Optics | |
| | IIS | 4360 | Engineering Economy | |
| | IIS | 4393 | Engineering Probability and Statistics | |
| | MET | 4340 | Thermodynamics A | |
| | MET | 4380 | Materials A | |

*EET 4341, EET 4342, and EET 4343 Power and Control Labs 1 through 3 may be substituted for EET 4327, EET 4328, and EET 4329 Advanced Electronic Labs 1 through 3.

Energy Systems Program

Energy systems is an interdisciplinary concentration demanding skills and knowledge from several areas of engineering technology. The consumption of energy, and the need for its conservation, has increased in the last two decades. The importance and the expense of natural resources have created a demand for individuals who can help develop and maintain systems designed to generate or use energy efficiently.

We offer an associate's degree program in energy systems.

The associate's degree program in energy systems offers you the opportunity to plan for more

efficient use of energy, for both residential and commercial settings. Classroom instruction coupled with laboratory experience helps develop the mathematics-science-English core into a career-oriented energy systems curriculum. There are opportunities to design, install, troubleshoot, repair, and maintain heating, ventilation, and air-conditioning systems. Additional career opportunities relate to the design and operation of nuclear power plants.

Energy Systems (Major Code 061)

The Energy Systems Program leads to the associate in science degree. Degree candidates must

earn 100 credits by completing the following four-year curriculum.

| | | | | |
|--------------------------------------|---------------|---|------|---|
| First-Year Courses | <i>Fall</i> | GET | 4170 | Engineering Graphics 1 |
| | | MTH | 4107 | College Algebra |
| | <i>Winter</i> | GET | 4100 | Computer Programming for Engineering Technology |
| | | MTH | 4108 | Pre-Calculus |
| | <i>Spring</i> | MET | 4344 | Energy Systems Theory and Hydraulics |
| | | MTH | 4120 | Calculus 1 |
| Second-Year Courses | <i>Fall</i> | MTH | 4121 | Calculus 2 |
| | | PHY | 4117 | Physics 1 |
| | <i>Winter</i> | ENG | 4110 | Critical Writing 1 |
| | | PHY | 4118 | Physics 2 |
| | | PHY | 4173 | Physics Lab 1 |
| | <i>Spring</i> | GET | 4306 | Technical Communications |
| | | PHY | 4119 | Physics 3 |
| | | PHY | 4174 | Physics Lab 2 |
| Third-Year Courses | <i>Fall</i> | EET | 4320 | Electricity and Electronics |
| | | MET | 4340 | Thermodynamics A |
| | <i>Winter</i> | CET | 4391 | Architectural Design 1 |
| | | MET | 4341 | Thermodynamics B |
| | <i>Spring</i> | MET | 4342 | Refrigeration and Air-Conditioning (AC) |
| | | MET | 4345 | Heating, Ventilating, and AC 1 |
| Fourth-Year Courses | <i>Fall</i> | MET | 4346 | Heating, Ventilating, and AC 2 |
| | | MET | 4347 | Distribution Systems for Mechanical Systems |
| | | MET | 4350 | Heating, Ventilating, and AC Lab |
| | <i>Winter</i> | MET | 4348 | Energy Conservation |
| | | () | | Technical Elective |
| | <i>Spring</i> | CET | 4393 | Construction Administration |
| | | MET | 4349 | Heating, Ventilating, and AC Systems Design |
| Suggested Technical Electives | | Same as Mechanical Engineering Technology, Suggested Technical Electives (see page 27). | | |

Manufacturing Engineering Technology Program

Manufacturing systems require interactions between machines and people. Manufacturing engineering technology is concerned with the design and use of manufacturing systems in the industrial environment.

We offer a bachelor's degree program in manufacturing engineering technology.

The bachelor's degree program in manufacturing engineering technology offers you the opportunity to become familiar with the machines, materials, and processes used in manufacturing.

The program emphasizes the emerging use of computers without sacrificing attention to traditional areas of a manufacturing education. Areas addressed in the program include materials and processes, computer-aided manufacturing, numerical control, and robotics. The core courses, combined with hands-on laboratory experiences, allow students to develop the skills required to work in manufacturing. Career opportunities are within various manufacturing industries, such as aircraft or electronics manufacturing.

Manufacturing Engineering Technology (Major Code 056)

The Manufacturing Engineering Technology Program leads to the bachelor of engineering technology degree. Degree candidates must

earn 187 credits by completing the following seven-year curriculum.

First-Year Courses

| | | | |
|---------------|-----|------|------------------------|
| <i>Fall</i> | CHM | 4111 | General Chemistry 1 |
| | MTH | 4107 | College Algebra |
| <i>Winter</i> | CT | 4105 | Pascal/Algorithms |
| | GET | 4170 | Engineering Graphics 1 |
| | MTH | 4108 | Pre-Calculus |
| <i>Spring</i> | GET | 4171 | Engineering Graphics 2 |
| | MTH | 4120 | Calculus 1 |

Second-Year Courses

| | | | |
|---------------|-----|------|--------------------------|
| <i>Fall</i> | MTH | 4121 | Calculus 2 |
| | PHY | 4117 | Physics 1 |
| <i>Winter</i> | ENG | 4110 | Critical Writing 1 |
| | PHY | 4118 | Physics 2 |
| | PHY | 4173 | Physics Lab 1 |
| <i>Spring</i> | GET | 4306 | Technical Communications |
| | PHY | 4119 | Physics 3 |
| | PHY | 4174 | Physics Lab 2 |

Third-Year Courses

| | | | |
|---------------|-----|------|---|
| <i>Fall</i> | MFG | 4321 | Computer-Aided Manufacturing 1 |
| | MTH | 4122 | Calculus 3 |
| <i>Winter</i> | IIS | 4393 | Engineering Probability and Statistics |
| | MFG | 4322 | Computer-Aided Manufacturing 2 |
| <i>Spring</i> | ENG | 4111 | Critical Writing 2 |
| | MFG | 4311 | Manufacturing Materials and Processes 1 |
| | (|) | Social Science/Humanities Elective |

| | | | |
|----------------------------|----------------|--|--|
| Fourth-Year Courses | <i>Fall</i> | MFG 4312 | Manufacturing Materials and Processes 2 |
| | | MFG 4331 | Computer Methods in Manufacturing Design 1 |
| | | () | Social Science/Humanities Elective |
| <i>Winter</i> | EET 4320 | Electricity and Electronics | |
| | MFG 4332 | Computer Methods in Manufacturing Design 2 | |
| <i>Spring</i> | ECN 4115 | Economic Principles and Problems 1 | |
| | () | Social Science/Humanities Elective | |
| | () | Social Science/Humanities Elective | |

| | | | |
|---------------------------|----------------|---------------------------------------|--------------------------------------|
| Fifth-Year Courses | <i>Fall</i> | IM 4314 | Productivity Enhancement and Quality |
| | | MET 4301 | Mechanics A |
| | | () | Social Science/Humanities Elective |
| <i>Winter</i> | IM 4301 | Introduction to Operations Management | |
| | MET 4302 | Mechanics B | |
| | MFG 4341 | Introduction to Computer-Aided Design | |
| <i>Spring</i> | () | Social Science/Humanities Elective | |
| | () | Technical Elective* | |

| | | | |
|---------------------------|----------------|------------------------------------|-----------------------------|
| Sixth-Year Courses | <i>Fall</i> | MET 4340 | Thermodynamics A |
| | | MFG 4381 | Plant Layout and Design |
| | <i>Winter</i> | MS 4332 | Statistical Quality Control |
| | | () | Technical Elective* |
| <i>Spring</i> | MFG 4351 | Assembly Automation | |
| | () | Social Science/Humanities Elective | |
| | () | Technical Elective* | |

| | | | |
|-----------------------------|----------------|------------------------------------|---------------------------------------|
| Seventh-Year Courses | <i>Fall</i> | IIS 4360 | Engineering Economy |
| | | MFG 4361 | Numerical Controlled Machines (Basic) |
| | <i>Winter</i> | MFG 4371 | Robotics |
| | | () | Technical Elective* |
| <i>Spring</i> | HRM 4301 | Organizational Behavior | |
| | () | Social Science/Humanities Elective | |
| | () | Technical Elective* | |

*Suggested technical electives are being developed for the manufacturing engineering technology curriculum.

Mechanical Engineering Technology Programs

Mechanical engineering technologists harness power resources that help machinery perform useful tasks. In contrast to civil engineering, which deals primarily with static forces and structures, mechanical engineering is concerned with the motion and kinetics of devices that are activated by hydraulic, electrical, mechanical, and thermodynamic forces.

We offer both an associate's and a bachelor's degree program in mechanical engineering technology. A bachelor's degree program in aerospace maintenance engineering technology is also offered.

The associate's degree offers you the opportunity to prepare to be an entry-level technician in designing, producing, and installing mechanical tools, machinery, engines, and transportation equipment. The bachelor's degree focuses on designing, developing, operating, and installing equipment that involves interactions of mechanical, hydraulic, and thermodynamic forces. The equipment may include machinery, engines, boilers, furnaces, air-conditioning systems, heating systems, and transportation.

Because of the mechanization of all industry, graduates of the associate's degree program in mechanical engineering technology may find entry-level career opportunities in almost any industry or engineering organization. Career opportunities for graduates of the bachelor's degree program are in industries that produce mechanized and automated equipment, in design and engineering organizations, and in companies that focus primarily on manufacturing and production.

The bachelor's degree program in aerospace engineering technology offers preparation for designing, developing, operating, installing, and producing aircraft and aircraft component systems. Career opportunities are available in technical, support, and management positions within the aircraft industry. Additional opportunities may be found within engineering teams that manufacture aircraft or spacecraft components, and among design/application positions in both the civilian and military aerospace markets.

Mechanical Engineering Technology

(Major Code 021)

The Mechanical Engineering Technology Program leads to the associate in engineering degree. The program is accredited by the Technology Accreditation Commission of

the Accreditation Board for Engineering and Technology. Degree candidates must earn 104 credits by completing the following four-year curriculum.

First-Year Courses

| | | | |
|---------------|-----|------|---|
| <i>Fall</i> | GET | 4170 | Engineering Graphics 1 |
| | MTH | 4107 | College Algebra |
| <i>Winter</i> | GET | 4171 | Engineering Graphics 2 |
| | MTH | 4108 | Pre-Calculus |
| <i>Spring</i> | GET | 4100 | Computer Programming for Engineering Technology |
| | MTH | 4120 | Calculus 1 |

Second-Year Courses

| | | | |
|---------------|-----|------|--------------------------|
| <i>Fall</i> | MTH | 4121 | Calculus 2 |
| | PHY | 4117 | Physics 1 |
| <i>Winter</i> | ENG | 4110 | Critical Writing 1 |
| | PHY | 4118 | Physics 2 |
| | PHY | 4173 | Physics Lab 1 |
| <i>Spring</i> | GET | 4306 | Technical Communications |
| | PHY | 4119 | Physics 3 |
| | PHY | 4174 | Physics Lab 2 |

Third-Year Courses

| | | | |
|---------------|-----|------|---------------------|
| <i>Fall</i> | CHM | 4111 | General Chemistry 1 |
| | MET | 4301 | Mechanics A |
| | MTH | 4122 | Calculus 3 |
| <i>Winter</i> | GET | 4364 | Kinematics |
| | MET | 4302 | Mechanics B |
| <i>Spring</i> | MET | 4314 | Stress Analysis A |
| | MET | 4380 | Materials A |

Fourth-Year Courses

| | | | |
|---------------|-----|------|------------------------------------|
| <i>Fall</i> | ECN | 4115 | Economic Principles and Problems 1 |
| | MET | 4315 | Stress Analysis B |
| | MET | 4390 | Measurement and Analysis Lab |
| <i>Winter</i> | ENG | 4111 | Critical Writing 2 |
| | MET | 4340 | Thermodynamics A |
| | MET | 4391 | Technology Lab A |
| <i>Spring</i> | MET | 4370 | Fluid Mechanics A |
| | MET | 4392 | Technology Lab B |
| | (|) | Social Science/Humanities Elective |

Mechanical Engineering Technology

(Major Code 023)

The Mechanical Engineering Technology Program leads to the bachelor of engineering technology degree. The program is accredited by the Technology Accreditation Commission

of the Accreditation Board for Engineering and Technology. Degree candidates must earn 186 credits by completing the following seven-year curriculum.

| | | | |
|----------------------------|---------------|----------------|---|
| First-Year Courses | <i>Fall</i> | GET 4170 | Engineering Graphics 1 |
| | | MTH 4107 | College Algebra |
| | <i>Winter</i> | GET 4171 | Engineering Graphics 2 |
| | | MTH 4108 | Pre-Calculus |
| | <i>Spring</i> | GET 4100 | Computer Programming for Engineering Technology |
| | | MTH 4120 | Calculus 1 |
| Second-Year Courses | <i>Fall</i> | MTH 4121 | Calculus 2 |
| | | PHY 4117 | Physics 1 |
| | <i>Winter</i> | ENG 4110 | Critical Writing 1 |
| | | PHY 4118 | Physics 2 |
| | | PHY 4173 | Physics Lab 1 |
| | <i>Spring</i> | GET 4306 | Technical Communications |
| | | PHY 4119 | Physics 3 |
| | | PHY 4174 | Physics Lab 2 |
| Third-Year Courses | <i>Fall</i> | CHM 4111 | General Chemistry 1 |
| | | MET 4301 | Mechanics A |
| | | MTH 4122 | Calculus 3 |
| | <i>Winter</i> | GET 4364 | Kinematics |
| | | MET 4302 | Mechanics B |
| | <i>Spring</i> | MET 4314 | Stress Analysis A |
| | | MET 4380 | Materials A |
| Fourth-Year Courses | <i>Fall</i> | ECN 4115 | Economic Principles and Problems 1 |
| | | MET 4315 | Stress Analysis B |
| | | MET 4390 | Measurement and Analysis Lab |
| | <i>Winter</i> | ENG 4111 | Critical Writing 2 |
| | | MET 4340 | Thermodynamics A |
| | | MET 4391 | Technology Lab A |
| | <i>Spring</i> | MET 4370 | Fluid Mechanics A |
| | | MET 4392 | Technology Lab B |
| | | () | Social Science/Humanities Elective |

| | | | | | |
|-------------------------------|----------------------|--------------------|------------------------------------|------------------------------------|------------------------|
| Fifth-Year Courses | Fall | IIS | 4360 | Engineering Economy | |
| | | MET | 4303 | Mechanics C | |
| | Winter | MET | 4341 | Thermodynamics B | |
| | | MET | 4371 | Fluid Mechanics B | |
| | Spring | MET | 4342 | Refrigeration and Air-Conditioning | |
| | | MET | 4416 | Stress Analysis C | |
| | | OR | | | |
| | | MET | 4481 | Materials B | |
| Sixth-Year Courses | Fall | MET | 4343 | Heat Transfer | |
| | | MET | 4393 | Technology Lab C | |
| | | () | Social Science/Humanities Elective | | |
| | Winter | MET | 4330 | Mechanical Design A | |
| | | MET | 4394 | Technology Lab D | |
| | | () | Social Science/Humanities Elective | | |
| | Spring | MET | 4331 | Mechanical Design B | |
| | | MET | 4395 | Technology Lab E | |
| | | () | Social Science/Humanities Elective | | |
| | Seventh-Year Courses | Fall | SPC | () | Communication Elective |
| () | | | Social Science/Humanities Elective | | |
| () | | | Technical Elective | | |
| Winter | | EET | 4320 | Electricity and Electronics | |
| | | SPC | () | Communication Elective | |
| | | () | Technical Elective | | |
| Spring | | () | Open Elective | | |
| | | () | Social Science/Humanities Elective | | |
| | | () | Technical Elective | | |
| Suggested Technical Electives | CET | 4301 | Plane Surveying | | |
| | CET | 4331 | Steel Design 1 | | |
| | CET | 4371 | Concrete Design 1 | | |
| | EET | 4321 | Electricity and Electronics 2 | | |
| | MET | 4414 | Mechanical Vibrations | | |
| | MET | 4415 | Experimental Stress Analysis | | |
| | MET | 4416 | Stress Analysis C | | |
| | MET | 4444 | Power Generation | | |
| | MET | 4481 | Materials B | | |
| MET | 4482 | Applied Metallurgy | | | |

Aerospace Maintenance Engineering Technology (Major Code 098)

The Aerospace Maintenance Engineering Technology Program leads to the bachelor of engineering technology degree. Before entering the program, degree candidates must complete the East Coast Aero Technical School airframe and power plant technical curriculum or its equivalent. In addition, degree candidates must

complete four prerequisite courses. The prerequisite courses are MTH 4107 College Algebra; MTH 4108 Pre-Calculus; MTH 4120 Calculus 1; and CHM 4111 General Chemistry 1. Degree candidates must earn at least 186 credits by completing the following five-year curriculum.

First-Year Courses

| | | | |
|---------------|----------------|------|---|
| <i>Fall</i> | GET | 4170 | Engineering Graphics 1 |
| | MTH | 4121 | Calculus 2 |
| <i>Winter</i> | GET | 4171 | Engineering Graphics 2 |
| | MTH | 4122 | Calculus 3 |
| <i>Spring</i> | GET | 4100 | Computer Programming for Engineering Technology |
| | () | | Social Science/Humanities Elective |

Second-Year Courses

| | | | |
|---------------|-----|------|--------------------------|
| <i>Fall</i> | ENG | 4110 | Critical Writing 1 |
| | PHY | 4117 | Physics 1 |
| <i>Winter</i> | ENG | 4111 | Critical Writing 2 |
| | PHY | 4118 | Physics 2 |
| | PHY | 4173 | Physics Lab 1 |
| <i>Spring</i> | GET | 4306 | Technical Communications |
| | PHY | 4119 | Physics 3 |
| | PHY | 4174 | Physics Lab 2 |

Third-Year Courses

| | | | |
|---------------|-----|------|------------------------------------|
| <i>Fall</i> | ECN | 4115 | Economic Principles and Problems 1 |
| | MET | 4301 | Mechanics A |
| <i>Winter</i> | MET | 4302 | Mechanics B |
| | MET | 4340 | Thermodynamics A |
| <i>Spring</i> | MET | 4314 | Stress Analysis A |
| | MET | 4380 | Materials A |

For the last two years, choose either curriculum A or B.

CURRICULUM A

| | | | |
|----------------------------|---------------|----------------|------------------------------------|
| Fourth-Year Courses | <i>Fall</i> | MET 4315 | Stress Analysis B |
| | | MET 4390 | Measurement and Analysis Lab |
| | | () | Social Science/Humanities Elective |
| | <i>Winter</i> | EET 4320 | Electricity and Electronics |
| | | MET 4391 | Technology Lab A |
| | | () | Social Science/Humanities Elective |
| | <i>Spring</i> | MET 4370 | Fluid Mechanics A |
| | | () | Social Science/Humanities Elective |

| | | | |
|---------------------------|---------------|----------------|------------------------------------|
| Fifth-Year Courses | <i>Fall</i> | MET () | Technical Elective |
| | | () | Social Science/Humanities Elective |
| | | | |
| | <i>Winter</i> | MET () | Technical Elective |
| | | () | Open Elective |
| | | () | Social Science/Humanities Elective |
| | <i>Spring</i> | MET 4481 | Materials B |
| | | () | Social Science/Humanities Elective |
| | | () | Social Science/Humanities Elective |

CURRICULUM B

| | | | |
|----------------------------|---------------|----------------|------------------------------------|
| Fourth-Year Courses | <i>Fall</i> | MET 4390 | Measurement and Analysis Lab |
| | | () | Social Science/Humanities Elective |
| | | () | Social Science/Humanities Elective |
| | <i>Winter</i> | EET 4320 | Electricity and Electronics |
| | | MET 4341 | Thermodynamics B |
| | <i>Spring</i> | MET 4370 | Fluid Mechanics A |
| | | () | Social Science/Humanities Elective |

| | | | |
|---------------------------|---------------|----------------|------------------------------------|
| Fifth-Year Courses | <i>Fall</i> | MET 4393 | Technology Lab C |
| | | MET () | Technical Elective |
| | | () | Social Science/Humanities Elective |
| | <i>Winter</i> | MET () | Technical Elective |
| | | () | Open Elective |
| | | () | Social Science/Humanities Elective |
| | <i>Spring</i> | MET 4481 | Materials B |
| | | () | Social Science/Humanities Elective |
| | | () | Social Science/Humanities Elective |

Suggested Technical Electives Same as Mechanical Engineering Technology, Suggested Technical Electives (see page 27).

Telecommunications Program

Telecommunications is an interdisciplinary concentration demanding skills and information from several areas of engineering technology. Modern society has experienced an unprecedented growth in information processing and communications, so that individuals who can help design and maintain information and communication systems are in high demand.

We offer an associate's degree program in telecommunications.

The associate's degree program in telecommunications offers you the opportunity

to study the electronic transfer of information through voice, data, or video media. Specific methods of electronic transfer, such as electronic signals in wires, light waves in optic fibers, and radio waves in the earth's atmosphere are discussed. There are career opportunities in the telephone, data processing, radio transmission/reception, cable television, service, and computer industries.

Telecommunications (Major Code 038)

The Telecommunications Program leads to the associate in science degree. Degree candidates

must earn 101 credits by completing the following four-year curriculum.

First-Year Courses

| | | | |
|---------------|-----|------|--|
| <i>Fall</i> | EET | 4180 | Introduction to Telecommunications |
| | MTH | 4107 | College Algebra |
| <i>Winter</i> | GET | 4138 | Introduction to Programming for Telecommunications |
| | MTH | 4108 | Pre-Calculus |
| <i>Spring</i> | GET | 4170 | Engineering Graphics 1 |
| | MTH | 4120 | Calculus 1 |

Second-Year Courses

| | | | |
|---------------|-----|------|--------------------------|
| <i>Fall</i> | MTH | 4121 | Calculus 2 |
| | PHY | 4117 | Physics 1 |
| <i>Winter</i> | ENG | 4110 | Critical Writing 1 |
| | PHY | 4118 | Physics 2 |
| | PHY | 4173 | Physics Lab 1 |
| <i>Spring</i> | GET | 4306 | Technical Communications |
| | PHY | 4119 | Physics 3 |
| | PHY | 4174 | Physics Lab 2 |

Third-Year Courses

| | | | |
|---------------|-----|------|------------------------------------|
| <i>Fall</i> | EET | 4151 | Circuit Analysis 1 |
| | EET | 4384 | Video Communications |
| <i>Winter</i> | ECN | 4115 | Economic Principles and Problems 1 |
| | EET | 4124 | Circuits Lab 1 |
| | EET | 4152 | Circuit Analysis 2 |
| <i>Spring</i> | EET | 4125 | Circuits Lab 2 |
| | EET | 4310 | Electrical Measurements |
| | ENG | 4111 | Critical Writing 2 |

Fourth-Year Courses

| | | | |
|---------------|-----|------|---|
| <i>Fall</i> | EET | 4311 | Electronics 1 |
| | EET | 4381 | Telecommunications Systems 1 |
| <i>Winter</i> | EET | 4312 | Electronics 2 |
| | EET | 4382 | Telecommunications Systems 2 |
| <i>Spring</i> | EET | 4323 | Electronics Lab |
| | EET | 4383 | Telecommunications Systems 3 |
| | MGT | 4101 | Introduction to Business and Management 1 |

Course Descriptions

Overview

This section contains the following information about each course offered by the School of Engineering Technology.

- **Course number.** Each alpha/numeric course number provides specific information. For example, consider the course number CET 4301.

CET 4301 The alpha code indicates which department is offering the course. In this case, the department is civil engineering technology.

CET 4301 The first number in the numeric code indicates whether the course meets during the day or in the evening. All 4000 series courses are offered in the evening; all 1000 series courses are offered during the day.

CET 4301 The last three numbers in the code indicate the course level: 001–099 are compensatory courses; 100–299 are introductory- to intermediate-level courses; and 300–699 are advanced-level courses.

- **Course title.**
- **Number of quarter hours (QH).** One quarter hour represents approximately three hours of student learning time (fifty minutes of lecture plus two hours of independent study) per week. If appropriate, class hours (CH) and lab hours (lab) are listed as well.
- **Quarters in which the course is offered.** Not all courses are offered every quarter. If the code TBA is printed next to a course title, call the program coordinator at 617-437-2500 for scheduling information.
- **Topics discussed in the course.**
- **Prerequisites.** Complete prerequisites before enrolling, unless otherwise specified.

Use the curriculum listed for your program to determine which courses you need to complete in the next academic year ("Degree Program

Descriptions," see page 5). Use the course descriptions to read about each specific course and to learn the quarters in which the course is offered. Because most courses are not offered every quarter, plan your course load for the entire academic year, not just the next quarter.

Before registration, get the *University College and School of Engineering Technology Schedule* for the next quarter by calling 617-437-2500. The *Schedule* provides you with the meeting times and locations for the courses being offered during the next quarter.

Academic counseling is available to help plan your course load for the coming academic year. If you need help, contact a School of Engineering Technology program counselor at 617-437-2500.

Policy on Changes of Program

The School of Engineering Technology reserves the right to cancel, modify, or add to the courses in any curriculum. The University further reserves the right to change the requirements for graduation. Any changes that may be made from time to time relative to this policy shall be applicable to all students in the school, college, or department concerned, including former students who may re-enroll.

Guidelines for Choosing Electives

Many of the degree program curricula require students to complete electives. The electives give students the opportunity either to explore topics beyond the curriculum's scope or to gain extensive knowledge about topics introduced by the core courses.

Open Electives

Any course is acceptable as an open elective except physical education, military science, and preparatory courses. An open elective may be either a three or a four quarter-hour course.

Social Science/Humanities Electives

Social science/humanities electives are offered through University College and must be chosen

from a list that is available from the School of Engineering Technology. Six quarter-hours of social science/humanities electives must be in the speech communications (SPC) category.

Technical Electives

Technical electives must be chosen from the list of suggested technical electives appearing at the end of the respective degree curriculum. Students wishing to take an upper-level course that does not appear on the list must petition for permission before attending the class. Students should submit a proposed program of elective courses—preferably representing a minor field of concentration consistent with personal career objectives—for approval by the program coordinator.

Civil Engineering Technology

CET 4301 Plane Surveying

(4 QH) Fall

Examines surveying principles; theory of measurements; leveling; traverse computations; area calculation; and stadia principles and topography.

Prereq. MTH 4108.

CET 4302 Geodetic Surveying

(4 QH) Winter

Introduces practical astronomy for surveying, including basic spherical trigonometry. Covers geodetic surveying, including precise leveling, triangulation, EDM equipment, and baseline measurements. *Prereq.* CET 4301.

CET 4303 Route Surveying

(4 QH) Spring

Studies simple and compound curves; vertical curves; earthwork computations; solution of the mass diagram; and an introduction to route location by photogrammetry. *Prereq.* CET 4301.

CET 4307 Legal Aspects of Surveying

(4 QH) Winter

Covers registry of deeds and probate; ownership of land; deeds; descriptions of qualifying expression; adverse possession; Massachusetts land court; and expert witness. *Prereq.* CET 4301.

CET 4311 Highway Engineering

(4 QH) Spring 1991

Explores engineering considerations in the planning and construction of modern highways and highway routing; traffic flow and traffic control; and computer applications to transportation problems. *Prereq.* CET 4301.

CET 4316 Land Use Planning

(4 QH) Fall 1991

Studies environmental, sociological, economic aspects, and traditional basis for land use planning. Covers objectives, content, form, and preparation of plan; community and public facilities; transportation; and environmental impact and plan implementation.

Prereq. GET 4171.

CET 4321 Introduction to Structural Design

(2 CH, 4 lab, 4 QH) Spring

Presents tabular methods for the design of members and connections using the AISC Code. *Prereq.* GET 4171 and MET 4314.

CET 4324 Structural Analysis 1

(4 QH) Fall

Surveys the reactions, shears, bending moments, and forces developed by loading systems on beams and trusses; influence lines for beams, girders, and trusses; and solutions for forces from moving load systems on statically determinate structures. *Prereq.* MET 4315.

CET 4325 Structural Analysis 2

(4 QH) Winter 1991

Covers classical methods of deflection solution for beams and trusses. Discusses methods of solving statically indeterminate structures.

Prereq. CET 4324.

CET 4331 Steel Design 1

(4 QH) Spring 1991

Examines design of steel members in structural frames; tension, compression, bending and eccentrically loaded members; and design of plate girders for buildings. *Prereq.* CET 4321 and MET 4315.

CET 4332 Steel Design 2

(4 QH) Fall 1991

Presents design of steel for highway bridges, composite design in bridges and buildings, introduction to plastic analysis, and design in steel.

Prereq. CET 4331.

CET 4341 Fluid Mechanics

(4 QH) Spring

This course has been replaced by MET 4370 Fluid Mechanics A.

CET 4350 Environmental 1

(4 QH) Winter 1991

Examines principles of water supply engineering; population forecasting; and quality and quantity of water for various uses. Other topics include water treatment processes; collection and disposal of wastewater and storm water; modern treatment methods; and wastewater plant operation. *Prereq.* CET 4341 and CHM 4111.

CET 4351 Environmental 2
(2 CH, 4 lab, 4 QH) Spring 1991

Studies the layout and design of water treatment and sewage treatment plants; and instrumentation and electrical equipment. Includes laboratory demonstrations. *Prereq.* CET 4350.

CET 4354 Advanced Industrial Wastewater Treatment (4 QH) TBA

Discusses environmental analysis, microbiology, biological treatment principles, and applications of physical-chemical treatment. Other topics include unit processes and operations, process trouble-shooting regulatory requirements, source reduction, and hazardous waste. *Prereq.* CET 4355 or CET 4356 or permission of instructor.

CET 4355 Biological Industrial Waste Treatment Operation (4 QH) TBA

Explores the operating principles and procedures of biological waste treatment as applied to industrial wastewaters. Emphasizes process calculations, controls, performance evaluation, monitoring, and microbiology along with operational problem definition and solution. *Prereq.* CET 4350 or equiv.

CET 4356 Physical-Chemical Industrial Waste Treatment Operations (4 QH) TBA

Introduces operational principles and procedures of the physical-chemical waste treatment process. Reviews chemistry related to precipitation, neutralization, oxidation reduction, and carbon absorption as well as the operation of ion exchange, reverse osmosis, and other membrane. Studies clarification and other solids separation methods along with sludge treatment options. *Prereq.* CET 4350 or equiv.

CET 4361 Materials and Soil Mechanics
(4 QH) Fall 1990, 1992

Examines the physical properties of portland cement, aggregates, mixing water and admixtures; batch proportioning; bituminous materials; index properties of soils, soil moisture and structure; compressibility; and theory of consolidation. *Prereq.* MET 4315.

CET 4371 Concrete Design 1
(4 QH) Winter

Examines the design of bending members, axially and eccentrically loaded columns by elastic and ultimate strength principles. *Prereq.* MET 4315.

CET 4372 Concrete Design 2
(4 QH) Spring 1990, 1992

Covers the reinforced concrete design of basic structures, including considerations of continuity. Includes an introduction to prestressed concrete member design. *Prereq.* CET 4371.

CET 4390 Technology of Modern Architecture
(4 QH) Fall 1990, 1992

Surveys architectural styles, both historical and contemporary, that emphasize engineering design and construction procedures required for the various types of buildings. *Prereq.* None.

CET 4391 Architectural Design 1
(4 QH) Winter 1991

Introduces basic architectural design concepts: proportion, scale, form, massing, color, texture, and lighting. Also examines orientation of structures, site organization, and selection of building materials. *Prereq.* CET 4390, GET 4171.

CET 4392 Architectural Design 2
(4 QH) Spring 1991

In this consideration of the building process, individual architectural design projects are assigned by the instructor. *Prereq.* CET 4391.

CET 4393 Construction Administration
(4 QH) Spring 1990, 1992

Discusses contracts, specifications, and bidding procedures; estimating and scheduling, including critical path; and discussion of personnel administration and union negotiation. Includes bid preparation for a small project. *Prereq.* None.

Chemistry

CHM 4101 Modern Chemistry 1*
(2 CH, 2.4 lab, 3 QH) Fall

This course has been replaced by CHM 4111 General Chemistry.

CHM 4111 General Chemistry 1*
(2 CH, 2.4 lab, 3 QH) Fall

Presents fundamental chemistry concepts such as symbols, formulas, equations, atomic weights, and calculations based on equations. Includes gases, liquids, solutions, and ionization. *The required lab is CHM 4117. Lab fee. Prereq.* MTH 4107 or equiv.

Computer Technology

CT 4105 Pascal/Algorithms
(4 QH) All Quarters

Studies using Pascal to develop problem-solving capabilities using computers. Covers problem solving, flowcharting, structured programming, loops, counters, and modularity. Includes Pascal language

*This is a University College course offered at a different tuition rate.

concepts such as data types, control statements, structures, arrays, procedures, functions, and input/output. *Prereq.* None.

CT 4150 Computer Organization

(4 QH) Winter

Presents basic computer architecture. Topics include number systems' operation and conversion, logic circuits, registers, data busses, ROM/RAM, microcomputer structure and operation, microprocessor internal components, microprocessor programming, and input/output processing.

Prereq. CT 4105.

CT 4310 FORTRAN/File Processing

(4 QH) Winter

Teaches FORTRAN 77 as a second language, emphasizing structured programming and modularity. Topics include lists, matrices, subroutines, functions, global values, variable formatting, random number generators, sorting, searching, character-data manipulation, file handling, and documentation. Project required. *Prereq.* CT 4105.

CT 4311 Programming with the C Language

(4 QH) All Quarters

Assumes knowledge of a higher-level language. Teaches the C language, a general-purpose language suitable for programming operating systems, text-processing, and databases. Covers data types, arithmetic expressions, program looping, decision making, arrays, functions, procedures, character strings, global and local variables, scope rules, pointers, address arithmetic, structures, unions, and the C input/output library. Project required. *Prereq.* CT 4310.

CT 4321 Programming with Ada

(4 QH) TBA

Teaches Ada, a programming language for numerical applications, system programming applications, and applications with real-time and concurrent execution requirements. Includes readability, strong typing, exception handling, data abstracting, tasking, and generic units. Involves using the University's computer facilities to write programs dealing with numerical and system programming applications. *Prereq.* CT 4105, CT 4311, GET 4100 or knowledge of Pascal, C, or FORTRAN.

CT 4330 Data Structures

(4 QH) Winter, Spring

Introduces methods of representing and manipulating data in computer memory. Covers stacks, queues, lists, trees, heaps, sets, graphs, hashing, searching, and sorting. Project required.

Prereq. CT 4311.

CT 4335 Numerical Methods

(4 QH) Spring

Presents computer methods for solving mathematical problems. Involves writing and running application programs using the University's computer

facilities. Covers deterministic versus stochastic methods, random number generators, iterative versus noniterative solutions, maxima and minima in two and three variables, curve fitting in two and three variables, integrals, trapezoidal and Simpson's rules, slopes, difference equations in two and three variables, vector and matrix algebra, simultaneous linear equations, nonlinear equations, permutations, and combinations. *Prereq.* CT 4105.

CT 4340 Software Engineering Design

(4 QH) Winter

Offers structured methods for developing complex computer software. Explores developing structured specifications, structured designs, and the computer programs for complex problems using the University's computers. Topics include partitioning, hierarchical organization, data flow diagrams, data dictionaries, structured English, decision trees, decision tables, structured charts, team design, structured programs, and maintainability.

Prereq. CT 4311.

CT 4345 Assembly Language

(4 QH) Winter

Teaches typical microprocessor assembly language. Involves writing and running programs on a 68000 microprocessor-based system. Covers CPU architecture, instruction sets, addressing modes, binary operation, code conversion, subroutines, macros, and input/output. *Prereq.* CT 4105 and CT 4150.

CT 4348 LISP

(4 QH) TBA

Introduces an interactive language in which the LISP interpreter is commonly referred to as the read-evaluate-print loop. Discusses various levels of implementation in LISP, a language well-suited to implement the standard techniques of data structure manipulation. Also explores techniques for recursion, complex data structures, storage management, and symbol table manipulation.

Prereq. CT 4330.

CT 4351 Advanced Computer Organization

(4 QH) Winter

Examines the functional characteristics of complex and special purpose computer systems, and the functions of general purpose multi-user and multi-processing operating systems. Advanced topics include virtual memory and virtual machine architectures, distributed and multiprocessor systems, array processors, and system performance analysis. *Prereq.* CT 4356 and CT 4375.

CT 4355 Micro Peripheral Hardware

(4 QH) Spring

Covers the elements of microprocessor peripheral hardware and its interfacing. Involves designing and analyzing microprocessor systems, including detailed schematics, timing diagrams, and technical documentation. Topics include serial

input/output devices, DMA and interrupt control devices, standard busses, bus arbitration techniques, and bus support VLSI. *Prereq.* CT 4374.

CT 4356 Complex Peripheral Hardware
(4 QH) Fall

Studies the interfacing and implementation of complex peripheral systems. Topics include disc and tape interfaces; graphic display devices; communication interfaces and subsystems; and input/output processors. *Prereq.* CT 4355.

CT 4360 Industry Software
(4 QH) Fall

Surveys current commercial software packages and methods. Involves the exercise of commercial packages implemented on the University's computer facilities where applicable. Topics include specific current packages and methods drawn from the categories of: database management, scientific and statistical analysis, security and privacy, software assurance, and documentation. *Prereq.* CT 4310.

CT 4363 Concurrent Programming
(4 QH) TBA

Examines the basic principles of concurrent programming. Students will write and run programs to demonstrate various aspects of concurrent programming techniques and issues. Topics include correctness of concurrent programs, material exclusion, timing Dekker's algorithms, the producer-consumer problem, monitors, semaphores, "Ada Rendezvous," critical regions, and conditional variables. *Prereq.* Experience in either Pascal or C.

CT 4365 Industry Hardware
(4 QH) Winter

Discusses the latest industrial developments and trends in computer hardware, conducted as a seminar. *Prereq.* CT 4356.

CT 4368 Semiconductor Logic
(4 QH) Fall

Analyzes the bipolar and MOS transistors in saturated and cutoff conditions. Examines implementing these concepts to form basic logic circuits and standard logic families, and convert logical expressions into hardware configuration representations. Topics include Ebers-Moll modeling, PMOS, NMOS, CMOS, bipolar characteristics, and standard logic families. *Prereq.* EET 4311.

CT 4369 Computer Logic
(4 QH) Winter

Introduces the hardware building blocks of digital computers. Teaches students to specify configurations of gates and memory components to achieve combinational and sequential composite logical functions, and perform finite state machine design and analysis. Topics include gates, flip-flops, registers, decoders, ALUs, memory arrays, and synchronous and asynchronous state machines. *Prereq.* CT 4368.

CT 4374 Introduction to CPU Hardware
(4 QH) Spring

Introduces the circuits and operation of microcomputers, focusing on microprocessor components and circuits, including detailed timing and functional analysis of their interactions. Topics include central processing unit, memory, addressing, clocking, bus concepts, interrupts, coprocessors, input/output, and instruction timing. *Prereq.* CT 4345 and CT 4368.

CT 4375 CPU Architecture
(4 QH) Fall

Presents high performance microprocessor architecture and hardware interfacing techniques. Analyzes current commercial processors and their support components. Topics include internal CPU architecture, memory management, instruction prefetch, privilege states, bus cycles, control lines, input/output, interrupts, exceptions, and pipelining. *Prereq.* CT 4374.

CT 4377 VLSI Design
(4 QH) TBA

Introduces Very Large Scale Integration (VLSI) Integrated Circuits (ICs), the key components of all modern computers. Examines MOS devices, circuits, design methods, and fabrication techniques used in producing custom VLSI ICs. Topics include MOS transistor characteristics; basic gate circuits; scaling; layout tools, both manual and automated; wafer fabrication techniques; standards; testing; and costs. *Prereq.* CT 4369.

CT 4379 Computer Networks
(4 QH) TBA

Investigates the functional and operational aspects of computer networks. Topics include the ISO Reference Model's seven layers, ARPANET, DECNET, and SNA. *Prereq.* CT 4380.

CT 4380 Data Communication Methods
(4 QH) Spring

Discusses the ISO Open Systems Interconnect model for communication systems, including the functional and operational aspects of data communication devices and software. Uses a black box approach. Topics include modems, control units, multiplexers, concentrators, front-end processors, and error checking. *Prereq.* CT 4375.

CT 4381 Operating Systems
(4 QH) TBA

Introduces the basic principles and organization of operating system implementation. Topics include processor management, process multiplexing and synchronization, schedules, atomic operations and mutual exclusion, sequential and concurrent programming, memory, and device and data management. *Prereq.* CT 4330 and CT 4345.

**CT 4382 Computer Graphics Programming
(4 QH) TBA**

Explores the computer plotting of two- and three-dimensional (2D and 3D) shapes. Involves writing and running programs using the University's computer and digital plotter. Topics include 2D transforms, 3D to 2D transforms, 3D transforms, surface representation, shading, hidden line, raster technology-color, introduction to interactive graphics, characters, curve fitting, and graphic data structures. *Prereq.* GET 4100.

**CT 4383 Databases
(4 QH) TBA**

Examines database organization structure and management. Involves writing and running programs exemplifying techniques developed in class, using the University's computer facilities. Topics include access methods, attributes, indices, keys, querying, searching and matching, file sets, inverted file sets, normal forms, and random access. *Prereq.* CT 4330.

**CT 4384 Large System Assembly Languages
(4 QH) TBA**

Explores Macro, a VAX-11 assembly language, to show how basic components in the CPU are used during program execution. Topics include integer, real, and character instruction sets, various addressing techniques, procedure linkage, and system input/output. *Prereq.* CT 4345.

**CT 4385 Introduction to Simulation Programming
(4 QH) TBA**

Introduces computer methods for solving simulated phenomena. Requires students to write and run programs implementing simulations. Topics include simple queues; multi-server queues; priorities including first in first out, last in last out; time aging of data; simple frequency distributions; and use of SIMULA, GPSS, and Standard Subroutine Library Routines. *Prereq.* CT 4335.

**CT 4387 Bit Slice Microcomputers
(4 QH) TBA**

The epitome of hardware flexibility is represented by the bit slice CPU. Students examine the basic design ground rules common to this style of hardware design. *Prereq.* CT 4355.

**CT 4389 Single-Chip Microprocessors
(4 QH) TBA**

When small 8-bit intelligent devices are rewired in high volume, the single-chip microprocessor in the form of the 3870, 8048, Z8, and others comes into play. An understanding of the hardware limitations of a single-chip system is the basis for this subject material. *Prereq.* CT 4374.

**CT 4390 Special Problems in Computer Technology
(4 QH) TBA**

Students perform theoretical or experimental work under individual faculty supervision. *Prereq.* Permission of department chair.

**CT 4393 UNIX Operating System
(4 QH) TBA**

Surveys advanced topics in the UNIX operating system and its filing system, including differences between the AT&T and Berkeley versions of UNIX. Also covers pipes, forks, execl, filter, signals, concurrency, processes, semaphores, EMACS, C preprocessor, macros, sed, grep, awd, make, gdb, dbx, lint, cb, lex, yacc, TeX, and shell programming. *Prereq.* CT 4330.

**CT 4394 Object-Oriented Programming
(4 QH) TBA**

Examines the methodologies currently used in object-oriented programming languages, drawing on case studies of Small Talk, Flavors, CLOS, and C⁺⁺. Other topics include G-Base, an object-oriented database system, and the concepts of abstraction, polymorphism, class inheritance, locks, and generic dispatch. *Prereq.* CT 4330.

**CT 4395 Computer Security
(4 QH) TBA**

Covers issues related to security in computing, including the history of security, encryption techniques and applications, secure communications, and software protection. Other topics include software verification and validation, designing security into the hardware, and products currently available for securing systems and data. These subjects will be addressed in terms of privacy as well as reliability. *Prereq.* CT 4380.

CT 4396 PROLOG: An Introduction to Artificial Intelligence (4 QH) TBA

Introduces fundamental artificial intelligence (AI) terms and techniques, using PROLOG as a programming language. Topics include knowledge representation, search, parsing, logic, and inference techniques. Projects required. *Prereq.* CT 4330.

Economics

ECN 4115 Economic Principles and Problems 1* (3 QH) All Quarters

Applies the basic principles of economics to current public problems. Focusing on macroeconomics, explores the issues of unemployment, inflation, national income and employment theory, and government expenditures and taxation. *Prereq.* None.

ECN 4116 Economic Principles and Problems 2* (3 QH) All Quarters

Continues ECN 4115, focusing on the role of the banking system, the Federal Reserve System, and supply-side policies. Topics in microeconomics include the role of a market pricing system, supply and demand, the costs of production, profits, and the supply decision. *Prereq.* ECN 4115 or equiv.

*This is a University College course offered at a

Electrical Engineering Technology

EET 4124 Circuits Laboratory 1**(3 lab, 2 QH) Fall, Winter**

Involves experiments in DC electrical circuits and the study of various measurement techniques. Includes use of ammeters, ohmmeters, voltmeters, VOMs, and power supplies. Studies equivalent resistance, series and parallel circuits, Ohm's Law, Thevenin and Norton Theorems, as well as superposition and maximum power transfer theorems. *Prereq. EET 4151.*

EET 4125 Circuits Laboratory 2**(3 lab, 2 QH) Winter, Spring**

Offers further experimentation in electrical circuits and measurement techniques. Involves the operation of oscilloscopes, audio frequency and function generators. Explores inductance, capacitance, and the effect of frequency upon them. Studies measurements of amplitude, frequency, and phase shift using a variety of series/parallel RL, RC, and RLC circuitry. Examines circuit time constants and their relation to repetition rate, along with resonance, circuit quality, and filter circuits. *Prereq. EET 4124.*

EET 4151 Circuit Analysis 1**(4 QH) All Quarters**

Introduces Ohm's law, Kirchoff's current and voltage laws, equivalent resistances, independent and dependent sources, mesh and nodal analysis, and power relations, all concentrating on direct current circuits. Other topics include Thevenin and Norton theorems, the operational amplifier, and energy storage elements such as the capacitor and inductor. *Prereq. MTH 4120 or PHY 4119.*

EET 4152 Circuit Analysis 2**(4 QH) All Quarters**

Studies the time domain (transient) analysis of R, L, and C elements; the energy storage in L and C circuits; and the responses in source-free RL and RC circuits. Includes the application of the unit step function and the response of RLC circuits. Introduces frequency domain methods to solve sinusoidal steady-state circuits using complex frequency concepts and phasor algebra. Also covers three-phase circuits and three-wire single-phase systems. *Prereq. EET 4151.*

EET 4180 Introduction to Telecommunications**(4 QH) Fall**

Introduces students to voice, video, and data communications. Surveys the development of telephony and the operation of the telephone network. Emphasizes current developments in communica-

tions, particularly the use of digital transmission and switching. Introduces terminology peculiar to telephony. (Not open to electrical engineering technology majors.) *Prereq. None.*

EET 4310 Electrical Measurements**(4 QH) Fall, Spring**

Examines standards of measurements, dimensional analysis, errors and measurements of dispersed data, discrete and continuous variables, binomial distribution, and normal distribution. Other areas include guaranteed error, methods of resistance measurements, digital voltmeters and analog to digital conversion, voltage references, potentiometers, and AC bridges. *Prereq. EET 4152.*

EET 4311 Electronics 1**(4 QH) All Quarters**

Introduces students to solid state electronic devices, such as diodes and transistors, emphasizing specifications, circuit characteristics, and techniques for analyzing circuit behavior. Investigates applications of diodes in rectification, power supply regulation, clipping, clamping, and voltage doubling situations. Involves analysis and design of transistor circuit topologies and bias networks. *Prereq. EET 4152.*

EET 4312 Electronics 2**(4 QH) All Quarters**

Investigates transistor bias stabilization of discrete and integrated circuits. Examines signal models of diodes and BJT, JFET, and MOSFET transistors. Analyzes single transistor amplifier configurations and multistage amplifiers. Investigates frequency response, amplitude, and phase characteristics of transistor circuits utilizing techniques such as the Bode plots. Presents design methods of coupling signals from one stage of an amplifier to another. *Prereq. EET 4311.*

EET 4313 Electronics 3**(4 QH) Fall, Winter, Spring**

Focuses on feedback and its application to operational amplifier circuits for signal processing and generation. Topics include stabilization of gain and bias, bandwidth improvement, distortion reduction, and impedance variation. Involves analysis and design of inverting and noninverting configurations of operational amplifier circuits, including rectifiers, oscillators, and filters. *Prereq. EET 4312.*

EET 4314 Pulse and Digital 1**(4 QH) Fall**

Studies the switching characteristics of semiconductor devices; logic gates and the logic families ECL, MOS, and Schottky TTL; speed limitations; and concepts of wave-shaping and wave-generating circuits including comparators, Schmitt trigger, and relaxation oscillators. *Prereq. EET 4311.*

EET 4315 Pulse and Digital 2**(4 QH) Winter**

Explores digital operations; logic statements and theorems; minimization of logic functions; flip-flops, counters, registers, and static and dynamic memory; sequential circuit design; sample and hold circuits; and analog-to-digital and digital-to-analog conversion. *Prereq.* EET 4314.

EET 4317 Principles of Communication Systems 1**(4 QH) Fall 1991**

Introduces signal analysis using Fourier methods; noise in communication systems; frequency selective amplifiers, including wideband; transistor power amplifiers AF and RF; oscillators; signal sources; and applications. *Prereq.* EET 4313.

EET 4318 Principles of Communication Systems 2 (4 QH) Winter 1992

Explores the basic theory of amplitude, frequency, phase, and pulse code modulated systems; analysis of modulating and demodulating circuits; carrier systems using SSB; system block and level diagrams; logic control circuits in communication systems; and modems. *Prereq.* EET 4317.

EET 4319 Principles of Communication Systems 3 (4 QH) Spring 1992

Presents the fundamentals of digital communications; sampling requirements; analog-to-digital conversion methods; system capacity and bandwidth; comparison of practical digital systems PAM, PCM, PFM, PWM; time and frequency division multiplexing; data decoding; and selected examples from telemetry and computer links. *Prereq.* EET 4318.

EET 4320 Electricity and Electronics**(4 QH) Fall, Winter**

Introduces students to circuit analysis, resistive networks, periodic excitation functions, steady state AC circuits; study of the physical foundations of electronics and the physical operation of electronic devices. (Not open to electrical engineering technology majors.) *Prereq.* MTH 4120 and PHY 4119.

EET 4321 Electricity and Electronics 2**(4 QH) TBA**

Discusses single-stage electronic circuits, magnetic circuits and transformers, electromechanical energy conversion, DC machines, and AC machines. (Not open to electrical engineering technology majors.) *Prereq.* EET 4320.

EET 4323 Electronics Laboratory**(3 lab, 2 QH) Spring**

Offers experimentation with nonlinear semiconductors. Explores junction and zener diodes. Studies typical applications in clippers, clampers, rectification, filtering, electronic power supplies, voltage

regulation, and integrated circuit regulators. Discusses bipolar and field effect transistors, amplifiers and voltage follower configurations, special semiconductors and operational amplifiers.

Prereq. EET 4311.**EET 4327 Advanced Electronics Laboratory 1 (3 lab, 2 QH) Fall**

Includes experiments using oscilloscopes and examines transistor audio amplifiers, push-pull amplifiers, drivers, pulse and video amplifiers, transients and wave-shaping circuits, audio frequency oscillators, and operational amplifiers. *Prereq.* EET 4323.

EET 4328 Advanced Electronics Laboratory 2 (3 lab, 2 QH) Winter

Experiments with the modulation of a class C amplifier, the diode detector, basic timing circuits, RF and crystal oscillators, astable multivibrators, logic gates, flip-flops, binary adders, registers, and counters. Considers active filters, frequency modulation detectors, and analog-to-digital and digital-to-analog conversion. *Prereq.* EET 4327.

EET 4329 Advanced Electronics Laboratory 3 (3 lab, 2 QH) Spring

Involves spectral studies of FM and PM waves; amplitude limiters; the balanced modulators and single sideband generators; integrated circuit timers and monolithic random access memory; and monolithic phase-locked loop. Offers microwave experiments and a series of digital experiments. *Prereq.* EET 4328.

EET 4330 Energy Conversion**(4 QH) Spring**

Explores the generalized theory of rotating energy conversion devices; steady-state operation of the multiply-excited direct-current machine; control of speed; special machines; transformers; steady-state considerations of induction and synchronous machines; generalized machine and circuit model; and Laplace transform techniques applied to the analysis of dynamic operating modes of rotating machines. *Prereq.* EET 4353.

EET 4337 Distributed Systems**(4 QH) Spring**

Examines radiation, transmission, and reception of electromagnetic waves; distributed-line constants and traveling waves of transmission lines; and differential equations of the uniform line. *Prereq.* MTH 4122 and PHY 4119.

EET 4341 Power and Controls Laboratory 1 (3 lab, 2 QH) Fall 1990, 1992

Introduces standard laboratory measurement equipment, including voltmeters, ammeters, oscilloscopes, and frequency counters, as well as data-taking methods and report writing.

Investigates diodes, bipolar transistors, field effect devices, silicon control rectifiers, unijunction transistors, power supplies, regulators, and various types of feedback transistor amplifiers. *Prereq. EET 4330.*

EET 4342 Power and Controls Laboratory 2
(3 lab, 2 QH) Winter 1991

Offers experiments with characteristics of DC motors and generators, single- and multi-phase transformers, induction motors, synchronous motors, and three-phase power measurements. *Prereq. EET 4341.*

EET 4343 Power and Controls Laboratory 3
(3 lab, 2 QH) Spring 1991

Offers experiments with self-synchronous devices such as control transformers, transmitters and receivers, AC and DC servomotors, and open and closed loop response of servomechanisms and stepping motors. *Prereq. EET 4342.*

EET 4353 Circuit Analysis 3
(4 QH) Fall, Winter, Spring

Examines the application of differential equations to the solutions of linear, time-invariant electrical networks. Introduces singularity functions, convolution, and time domain transient analysis; network topology and duality; and the methods of transformation calculus and complex frequency concepts. *Prereq. EET 4152.*

EET 4354 Circuit Analysis 4
(4 QH) Fall, Winter, Spring

Covers signal analysis in the frequency domain; Fourier series; and Fourier and Laplace transform methods. Requires solving circuit problems using Laplace transforms and related theorems. *Prereq. EET 4353.*

EET 4360 Photovoltaic Technology
(4 QH) TBA

Examines the theory, operation, installation, and monitoring of a photovoltaic power system. Topics include the physics of silicon photovoltaic cells: amorphous, polycrystalline, and single crystal. Lab included. *Prereq. EET 4311 and PHY 4119.*

EET 4362 Basic Power Systems 1
(4 QH) Fall 1990, 1992

Considers power transmission lines; line constants; current voltage and power relations; introduction to electric-power distribution loads, feeders, and substations; and application of matrices. *Prereq. EET 4354.*

EET 4363 Basic Power Systems 2
(4 QH) Winter 1991

Studies symmetrical and unsymmetrical faults; protective devices—application and coordination; power flow in electric circuits; steady-state power limitations of systems; and voltage regulation theory and application. *Prereq. EET 4362.*

EET 4364 Basic Power Systems 3
(4 QH) Spring 1991

Examines computer applications to power systems with emphasis on load-flow studies; and basic ideas of systems planning, short-circuit studies, and system stability. *Prereq. EET 4363.*

EET 4370 Digital Computers 1
(4 QH) Fall

Introduces the field of digital computer design. Topics include general computer organization, number systems and number representations, design characteristics of major computer units, and Boolean Algebra applications to computer design. *Prereq. EET 4314.*

EET 4371 Digital Computers 2
(4 QH) Winter

Examines microprocessor architecture and organization. Studies the machine language and assembly coding of an industry-accepted microprocessor. Assigns an assembly language coding problem and analyzes a suitable topic from the current literature. *Prereq. EET 4370.*

EET 4377 Control Engineering 1
(4 QH) Fall, Winter

Analyzes linear servomechanisms under both transient and steady-state conditions. Topics include signal flow graphs and Laplace transforms used in the formulation of block diagrams, and transfer function. *Prereq. EET 4354 and MTH 4122.*

EET 4378 Control Engineering 2
(4 QH) Winter, Spring

Studies system stability, root locus techniques, treatment of Nyquist criteria, and Bode diagram methods for systems evaluation. *Prereq. EET 4377.*

EET 4381 Telecommunications Systems 1
(4 QH) Fall

Presents transmission system fundamentals, beginning with the development of the information to be transmitted in the form of voice, video, or data signals. Examines information transmission including baseband and multiplex systems. Stresses encoding analog signals into a digital format and multiplexing digital signals into the digital hierarchy. Also examines current digital transmission systems such as T-carrier, digital radio, and fiber optic systems. (Not open to electrical engineering technology majors.) *Prereq. EET 4152 or equiv.*

EET 4382 Telecommunications Systems 2
(4 QH) Winter

Introduces switching theory and practice, historical development, and circuit switching. Examines packet switching and the basics of traffic engineering. Considers time division versus space division switching, switching systems software, and digital switch architecture. (Not open to electrical engineering technology majors.) *Prereq. EET 4381.*

**EET 4383 Telecommunications Systems 3
(4 QH) Spring**

Continues EET 4381 and EET 4382 by examining networks comprised of switching and transmission equipments. Considers networks of particular interest to students, including the interaction between private (PABX or key systems) networks and the public (local telephone company) network. Discusses signaling systems that communicate between portions of the network. Involves developing a transmission level plan that will tie together the subject matter. (Not open to electrical engineering technology majors.) *Prereq. EET 4382.*

**EET 4384 Video Communications
(4 QH) Fall**

Examines the television signal, synchronization, balancing and interleaving, cameras, transmitters and receivers, video cassette recorders, video discs, and cable networks. (Not open to electrical engineering technology majors.) *Prereq. EET 4151, EET 4180, and PHY 4119.*

**EET 4391 Basic Optics and Optical Systems Design
(4 QH) Fall**

Involves developing the basics of optical imaging in the Gaussian approximation and analyzing the various designs stemming from lens aberration, intent and forms of optical systems, and flux throughput. Presents the essentials of a wave description of light along with instrumental designs for exhibiting interference and diffraction. Assumes no previous background in optics. *Prereq. MTH 4108 and PHY 4119.*

**EET 4392 Optoelectronics and Fiber Optics
(4 QH) Spring**

Presents an overview of the various elements and their characteristics utilized in optical communication systems—elements that generate light (lasers, diodes); modulate light (as in scanning or information encoding); transfer light (optical fibers); detect light; and display and store light or its encoded information. *Prereq. EET 4393 and MTH 4108.*

**EET 4393 Applied Wave Optics
(4 QH) Winter**

Offers a wave optical approach to classical and modern imaging, and to interference/diffraction instrumentation and devices. Emphasizes a physically descriptive analysis of such applications as nondiffractive interference effects (interferometers, interference filters, high and anti-reflection films, and longitudinal 'laser' cavity modes) and diffraction effects (apertures and gratings). Also discusses wave imagery, image processing, and the 3-D imaging of holography; polarization phenomena and associated materials and devices; and basic quantum optics. *Prereq. EET 4391, MTH 4108, and PHY 4119 or permission of instructor.*

EET 4399 Special Problems in Electrical Engineering Technology (4 QH) TBA

Engages students in theoretical or experimental work under individual faculty supervision.

Prereq. Permission of department chair.

English

ENG 4110 Critical Writing 1***(3 QH) All Quarters**

Offers a detailed examination of the principles and methods of rhetoric, especially narration, description, and exposition. Coursework includes frequent practice in writing paragraphs and themes in those modes. *A writing proficiency test is given at the first class meeting.*

ENG 4111 Critical Writing 2***(3 QH) All Quarters**

Further examines the principles and methods of rhetoric, especially persuasion and argument, the study of short fiction, and the development of research skills. Coursework includes practice in writing persuasive and critical themes and preparing research papers. *Prereq. ENG 4110 or equiv.*

General Engineering Technology

GET 4100 Computer Programming for Engineering Technology (4 QH) All Quarters

Introduces the use of computers for problem solving using FORTRAN 77. Topics include flowcharts, DO loops, arrays, subroutines, functions, and character manipulations. Students use the University's computer facilities to run program assignments. *Prereq. MTH 4108.*

GET 4120 COBOL**(4 QH) TBA**

Studies the COBOL language through its applications in business problems. Covers basic concepts quickly, emphasizing the more advanced topics of table handling; sorting; and sequential, index, random, and dynamic file processing. Requires an extensive project. (Not open to students who have taken CT 4320.) *Prereq. None.*

GET 4138 Computer Programming for Telecommunications (4 QH) Winter

Introduces the major components of the computer and how they function together. Topics include algorithms, programming philosophy, and flow

*This is a University College course offered at a different tuition rate.

charts. Studies a high-level language to enable students to write programs and run them on the University's computer system. *Prereq. None.*

GET 4144 Introduction to Personal Computer
(4 QH) TBA

Explores the use, capabilities, and limitations of the DOS operating system and popular application software packages such as Lotus 1-2-3, dBase III, and RELAY. Requires writing and running programs in the BASIC programming language using the University's computers. Discusses costs and benefits of different personal computer configurations and expansion options. (Not open to students who have taken CT 4344.) *Prereq. None.*

GET 4170 Engineering Graphics 1
(4 QH) All Quarters

Introduces students to freehand, instrument, and computer engineering drawing using geometric constructions. Topics include descriptive geometry; orthographic projection; sections; and isometric, oblique, and perspective drawings. *Prereq. None.*

GET 4171 Engineering Graphics 2
(4 QH) Fall, Winter, Spring

Studies the use of computer and manual drawing in layout and assembly graphics. Course topics include manufacturing processes, fasteners, gears, welding, electric/electronic drawing, architectural/structural drawing, piping, and topography. Requires a design project. *Prereq. GET 4170.*

GET 4172 Electrical Engineering Graphics
(4 QH) Fall, Winter, Spring

Introduces manual and computer electronic graphics, including symbols, schematics, block and logic diagrams, production and cable drawings, and military standards. Also covers single- and double-sided printed circuit layouts, integrated circuits, electromechanical designs, wiring, and interconnection diagrams, and graphical data presentation. *Prereq. GET 4170.*

GET 4306 Technical Communications
(3 QH) Fall, Winter, Spring

Offers an opportunity to learn the style and content guidelines for technical writing, refines technical writing skills, and develops the ability to prepare and deliver oral presentations of a professional calibre. *Prereq. ENG 4110.*

GET 4364 Kinematics
(4 QH) Winter

Presents four-bar linkages, sliders, and other devices using orthogonal components of vectors, instantaneous centers, equivalent linkages, and effective cranks. Emphasizes graphic solutions, and provides an introduction to the computer to enhance these concepts. Also covers reverted and epicyclic gear trains and cam displacement. *Prereq. GET 4171 and PHY 4117.*

Human Resources Management

HRM 4301 Organizational Behavior*
(3 QH) Fall

Examines the fundamentals of organizational life, emphasizing the structure and discipline of groups typically found in a business setting. Topics include issues and data related to leadership styles, employee motivation, and organizational dynamics. Significant student participation is required. *Prereq. None.*

Industrial Engineering Technology

IIS 4360 Engineering Economy
(4 QH) Fall

Presents fundamental accounting concepts and terminology, including assets, liability, net worth, and the analysis of income statements and balance sheets. Discusses introductory steps in the analysis of investment proposals, time value of money, and cash flows. Analyzes cash flows in terms of present worth, annual worth, rate of return, and benefit/cost ratio. Considers depreciation and tax effects on cash flows. *Prereq. MTH 4107.*

IIS 4393 Engineering Probability and Statistics
(4 QH) Winter

Studies the algebra of events and sets, and the laws of probability. Examines the properties of discrete and continuous random variables, including density function, expected value, variance, conditional probability, independent event, and Bayes' theorem. Presents common distributions: normal, uniform, and binomial. Also covers random variables, point estimation, confidence intervals, sampling statistics, central limit theorem, and associated sampling distributions. *Prereq. MTH 4122.*

Industrial Management

IM 4301 Introduction to Operations Management*
(3 QH) Winter

Surveys the concepts and principles of operations from a management point of view. Looks at operations in relation to other business functions and as a transformation process, with inputs of materials, investment, and people producing finished goods/services. Topics include product and process

*This is a University College course offered at a different tuition rate.

design, forecasting demand, capacity planning, facilities design, aggregate planning, scheduling, and quality control and assurance.

Prereq. MS 4325 or equiv.

IM 4314 Productivity Enhancement and Quality* (formerly Production Control and Inventory Management) (3 QH) Fall

Studies the fields of quality control and productivity as a body of managerial, technological, behavioral, and economic knowledge, and examines the organized application of this knowledge to the practical improvement of operations. Considers current productivity improvement programs such as measurement and control, and explores the relationship between increased productivity and managing for higher quality. Reviews current management practices of quality control, approaches to optimizing quality, economics of total quality, internal and external quality, and management of long-term quality and reliability. *Prereq.* MS 4332.

Mechanical Engineering Technology

MET 4301 Mechanics A

(4 QH) Fall

Studies the forces, moments, couples, and statics of particles and rigid bodies in two and three dimensions. Examines external and internal distributed forces, first moments and centroids, as well as structure-trusses, frames, and machines. *Prereq.* MTH 4120 and PHY 4117.

MET 4302 Mechanics B

(4 QH) Winter

Explores friction, second moments, and virtual work; the kinematics of particles; force, mass and acceleration; work and energy. *Prereq.* MET 4301.

MET 4303 Mechanics C

(4 QH) Fall

Studies the impulse and momentum of particles; the kinematics and dynamics of rigid bodies, force, mass, and acceleration; and the dynamics of rigid bodies—work and energy. Also covers mechanical vibration. *Prereq.* MET 4302.

MET 4314 Stress Analysis A

(4 QH) Winter, Spring

Examines axially loaded members, stress and strain, allowable stresses, factor of safety, temperature effects, indeterminate members, thin-walled pressure vessels, and centric loading of bolted and welded connection. Other topics include shear and

moment beams; eccentrically loaded connections; and flexural and transverse shearing stresses in beams. *Prereq.* MET 4301.

MET 4315 Stress Analysis B

(4 QH) Fall, Spring

Presents determinate and indeterminate beam deflections and reactions by integration and area moment methods. Topics include torsional stresses and strains; power transmission; eccentric loads on struts, beams, riveted and welded joints; combined stresses; principal stresses; Mohr's circle; and theories of failure. *Prereq.* MET 4314.

MET 4319 Mechanics

(4 QH) Spring

Provides an introduction to mechanics for nonmechanical majors. *Prereq.* MTH 4120 and PHY 4117.

MET 4330 Mechanical Design A

(4 QH) Winter

Introduces the principles of mechanical design, the design process, design factors, creativity, optimization, human factors, and value engineering through simple design projects. Examines principles of design, properties, and selection of materials; stress concentrations; strength under combined stresses; theories of failure; impact; and fluctuating and repeated loads. *Prereq.* MET 4314 and MET 4380.

MET 4331 Mechanical Design B

(4 QH) Spring

Studies the deformation and design of fasteners, screws, joints, springs, and bearings, lubrication, and journal bearings. Covers stresses and power transmission of spur, bevel, and worm gear; shaft design, and clutches and brakes. *Prereq.* MET 4330.

MET 4340 Thermodynamics A

(4 QH) Fall, Winter

Introduces the general theory of heat and matter; laws of thermodynamics; energy-transformation principles and availability of energy; and properties and processes for pure substances and ideal gases. Also covers thermodynamic properties and processes of liquids and vapors; tables and charts; mixtures of fluids; and vapor cycles. *Prereq.* CHM 4111 and PHY 4118.

MET 4341 Thermodynamics B

(4 QH) Winter

Discusses the theory of vapor engines and analysis of types of actual engines using compression of gases and vapors; internal combustion engines; theory of gas and vapor flow through orifices and nozzles; design and performance of steam and gas turbines; spark-ignition and compression-ignition engine design and performance; and fan performance. *Prereq.* MET 4340.

*This is a University College course offered at a different tuition rate.

MET 4342 Refrigeration and Air-Conditioning (4 QH) Spring

Introduces air-conditioning principles, including psychometrics and heat pumps. Topics include calculation of heating and cooling loads in accordance with ASHRAE practices; principles of gas compression; analysis of vapor compression; refrigeration systems; low-temperature refrigeration cycles; and absorption refrigeration systems. *Prereq. MET 4341.*

MET 4343 Heat Transfer (4 QH) Fall

Presents the basic principles of heat transfer: thermal conductivity and thermal conductance/resistance. Examines heat transfer mechanisms, the basic equations of conduction, and natural and forced convection. Studies the hydrodynamic and thermal boundary layers, black body radiation, and Kirchoff's law. Other topics include emissivity and absorptivity, the radiation between simple bodies, heat transfer coefficients, heat exchanger effectiveness, and regenerative and evaporative heat exchangers. *Prereq. MET 4341.*

MET 4344 Energy Systems Theory and Hydronics (4 QH) Spring

Discusses the elementary principles of heat transfer; heat loss calculations of buildings; HVAC fundamentals; and architectural technology and building materials. Also covers the election of heat transmission coefficients, instrumentation, heat transfer coefficients, heating load, combustion, and venting. Instruction includes the study of basic hydraulics and hot water heating, fluid flow, pumps, boilers, and forced circulation. *Prereq. GET 4170 and MTH 4108.*

MET 4345 Heating, Ventilating, and Air-Conditioning 1 (4 QH) Spring

Examines fundamental design data on HVAC including climatic data, temperature variations, weather maps, heat gains from sun, industrial degree days, and city and well water temperature variations. Discusses gains and losses from other sources; requirements for industrial plants and office and commercial buildings; and overall heat transmission coefficients. *Prereq. MET 4341.*

MET 4346 Heating, Ventilating, and Air-Conditioning 2 (4 QH) Fall

Explores the properties of moist air and interprets air-conditioning processes on the psychometric chart. Topics include air distribution; outlet performance; volume control; noise limitations; selection and location of surface outlets; flow measuring devices; and system balancing. Develops designs of complete ductwork systems for both high and low velocity systems. Includes flow duct design, centrifugal fans, air cleaning, radiant heating, and heat pump. *Prereq. MET 4345.*

MET 4347 Distribution Systems for Mechanical Systems (4 QH) Fall

Develops distribution and/or collection systems for the layout of ducts and pipes for heating, ventilation, air-conditioning, water supply, and plumbing networks based on theoretical consideration. Emphasizes empirical approaches used within the industry. Includes codes and standards relating to materials selection and estimating aspects. *Prereq. MET 4345.*

MET 4348 Energy Conservation (4 QH) Winter

Analyzes a given building envelope with fixed parameters, considering heat gains and losses and energy consumption from various sources. Examines techniques for investigating and improving energy conservation factors and influencing energy costs and management. Uses these concepts to develop energy auditing techniques. *Prereq. MET 4347.*

MET 4349 Heating, Ventilating, and Air-Conditioning Systems Design (4 QH) Spring

Examines a building with fixed parameters to show how heating, ventilating, and air-conditioning systems' main unit sizes are selected and how the various working substances are distributed into the building. Involves presenting plans and schematics of the final design necessary to install the systems. *Prereq. MET 4348.*

MET 4350 Heating, Ventilating, and Air-Conditioning Laboratory (3 lab, 2 QH) Fall

Involves lab experiments on the variation of water and air flows in pipe and duct systems, and measurements of the efficiency of fan systems under various outlet conditions. Considers the basic operating conditions of heating and refrigeration systems along with the heat transfer conditions of pipe/duct insulation and fin coil systems. *Prereq. MET 4345.*

MET 4370 Fluid Mechanics A (4 QH) Spring

Examines hydrostatics; principles governing fluids at rest; pressure measurement; hydrostatic forces on submerged areas and objects; simple dams; fluids in moving vessels; and hoop tension. Discusses fluid flow in pipes under pressure; fluid energy, power, and friction loss; Bernoulli's Theorem; and flow measurement. *Prereq. MET 4302.*

MET 4371 Fluid Mechanics B (4 QH) Winter

Considers pipe networks and reservoir systems, flow in open channels, and uniform flow. Also covers energy, friction loss, minor losses, velocity distribution, alternate stages of flow, critical flow, nonuniform flow, accelerated and retarded flow, and hydraulic jump and waves. *Prereq. MET 4370.*

MET 4380 Materials A**(4 QH) Spring**

Studies fundamental metallic structures, general metallurgical information covering theoretical aspects of properties, and testing and failure of metals. Topics include alloying and hardening of metals, refinement of metals, equilibrium diagrams, characteristics of engineering metals, and principles of metal fabrication. *Prereq. None.*

MET 4390 Measurement and Analysis Laboratory (3 lab, 2 QH) Fall

Discusses experiments requiring collection and analysis of data by graphical and numerical methods. Examines computer applications and report writing to draw conclusions relative to accuracy, precision, true values, and measured values as they relate to basic mechanical measuring instruments. *Prereq. GET 4100, MET 4314, MTH 4122, and PHY 4119.*

MET 4391 Technology Laboratory A**(3 lab, 2 QH) Winter**

Conducts experiments to determine mechanical properties of materials under normal and abnormal environmental conditions. Examines the effects of homogeneity, nonhomogeneity, isotropy, and nonisotropy. *Prereq. MET 4315, MET 4380, and MET 4390.*

MET 4392 Technology Laboratory B**(3 lab, 2 QH) Spring**

Conducts experiments to determine the physical properties of incompressible fluids, measure flow rates and velocities utilizing pitot tubes, orifice plates, venturii meter, and weirs flow meters, U-tube differential manometers, and piezometers. *Prereq. MET 4370 (may be taken concurrently) and MET 4390.*

MET 4393 Technology Laboratory C**(3 lab, 2 QH) Fall**

Explores basic thermodynamic relationships. Conducts experiments to examine the flow of compressible fluids and steam and to examine the energy conversion of a fuel into a working substance. Examines related heat transfer mechanisms along with operating characteristics of thermal generators, engines, and compressors. *Prereq. MET 4341 and MET 4390 (may be taken concurrently).*

MET 4394 Technology Laboratory D**(3 lab, 2 QH) Winter**

Conducts experiments to examine the operating characteristics and efficiencies of internal combustion engines, brake horsepower, indicated horsepower, mean effective pressure, fuel consumption, torque, ignition timing, manifold pressure, and compression ratios and internal engines as energy conversion systems. Also covers energy conversion of fuels. *Prereq. MET 4341, MET 4343 (may be taken concurrently), and MET 4393.*

MET 4395 Technology Laboratory E**(3 lab, 2 QH) Spring**

Offers advanced and specialized experiments in refrigeration, air-conditioning, and heating pump cycles. *Prereq. MET 4342, MET 4343, and MET 4390.*

MET 4414 Mechanical Vibrations**(4 QH) TBA**

Studies the elements of vibrating systems, one degree of freedom, natural frequencies, damped free and forced vibration, impedance and mobility, systems with more than one degree of freedom, influence coefficients, Lagrange's equations, generalized coordinates, and vibration absorber. *Prereq. MET 4303.*

MET 4415 Experimental Stress Analysis**(4 QH) TBA**

Examines theory and experimentation showing the application of extensometers and electrical strain gauges and transducers in the field of experimental stress and strain analysis. Also covers theory and laboratory practice on photoelastic methods as applied to classical model analysis and modern coating analysis. *Prereq. MET 4315.*

MET 4416 Stress Analysis C**(4 QH) Spring**

Discusses curved beams, nonsymmetrical bending of beams, shear center and shear stresses on thin sections, and composite beams. Also covers columns, energy absorption and resilience, inertial stresses, impact loading, deflection of beams by energy methods, and bolted fastenings. *Prereq. MET 4315.*

MET 4444 Power Generation**(4 QH) TBA**

Explores electrical power generation by thermomechanical, electromechanical, nuclear, and hydraulic systems. Emphasizes the analysis of thermodynamic cycles as well as the practical deviations from the related ideal processes. Considers accessory and auxiliary equipment used in such systems. Studies design, performance, economic factors, and public issues affecting electric power generation. *Prereq. MET 4341.*

MET 4481 Materials B**(4 QH) Spring**

Discusses inorganic materials, materials having electrical and magnetic properties, and applications for the fabrication and use of both metals and nonmetals. Examines structures of metals, imperfections, and phase diagrams. Explores the effect of temperature on structure and properties of metals along with strengthening mechanisms and the mechanical properties of nonferrous metals. Offers experiments in preparation of samples, selection, polishing, and etching. Involves completing an examination of nonferrous metals and additional

lab work in the construction of cooling curves and binary phase diagrams. *Prereq.* MET 4380.

MET 4482 Applied Metallurgy
(4 QH) TBA

Examines mechanical properties of ferrous metals, the iron carbon diagram, high-temperature alloys, hardening methods, impact tests, and the effects of environment. Also discusses manufacturing processes and methods of fabrication. Offers experiments in the analysis of stress-strain diagrams, heat treatment, surface corrosion, tempering, and drawing, as well as ferrous and nonferrous metals. *Prereq.* MET 4481.

Manufacturing Engineering Technology

MFG 4311 Manufacturing Materials and Processes 1 (4 QH) Spring

Examines the structures of polymers (thermoplastics, thermosetting, glass, and rubber); manufacturing processes for polymers; thermoforming; structures of metals; and the manufacturing processes for metal forming. Also covers alloys, nonferrous metals, and various manufacturing methods and processes. *Prereq.* CHM 4101 or CHM 4111, and PHY 4117.

MFG 4312 Manufacturing Materials and Processes 2 (4 QH) Fall

Continues MFG 4311. *Prereq.* MFG 4311.

MFG 4321 Computer-Aided Manufacturing 1
(4 QH) Fall

Gives an overview of computer-aided manufacturing (CAM), including group technology; material requirements planning; part coding and classification; numerical control; part programming; and management systems. Covers each area to instill an appreciation of the coming reality of the automated factory. *Prereq.* None.

MFG 4322 Computer-Aided Manufacturing 2
(4 QH) Winter

Continues MFG 4321. *Prereq.* MFG 4321.

MFG 4331 Computer Methods in Manufacturing Design 1 (4 QH) Fall

Investigates the use of computers in selected areas of manufacturing systems design. Topics include numerical control, MRP II, computer-aided process planning and control, and other important applications of computers to manufacturing. *Prereq.* MFG 4311 and MFG 4322.

MFG 4332 Computer Methods in Manufacturing Design 2 (4 QH) Winter

Continues MFG 4331. *Prereq.* MFG 4331.

MFG 4341 Introduction to Computer-Aided Design
(4 QH) Winter

Introduces computational and numerical geometry for design, and studies the implementation of computer graphics in design and use of computer-aided design packages, as well as principles of numerical control techniques in design and manufacture. Involves a design project. *Prereq.* CT 4105 or FORTRAN.

MFG 4351 Assembly Automation
(4 QH) Spring

Examines the field of automatic assembly; topics include automatic vibratory feeders, nonvibratory feeders, and the automatic orientation of parts to be fed. Also covers the economics of automatic assembly. Involves designing an automated assembly system if time permits. *Prereq.* MFG 4322 and MFG 4332.

MFG 4361 Numerical Controlled Machines (Basic)
(4 QH) Fall

Begins with a week-long review of numerical controlled machines from material covered in MFG 4321 and MFG 4322. Provides an introduction to DNC and CNC systems followed by the study of numerical controlled machines and programming in the APT programming language. *Prereq.* MFG 4322, MFG 4332, and MFG 4341.

MFG 4371 Robotics
(4 QH) Winter

Discusses the concept, classification, and structure of robots and their application in manufacturing. Topics include drive and control systems; kinetics, coordinate transformations, and trajectory interpolators; and the application, programming, and integration of robots into the manufacturing environment. *Prereq.* MFG 4361.

MFG 4381 Plant Layout and Design
(4 QH) Fall

Examines the use of descriptive and optimizing models—for example, simulation, queuing theory, and linear programming—to design facilities and associated material handling systems. Applies computer-assisted layout analysis techniques to practical problems. *Prereq.* IM 4301.

Management

MGT 4101 Introduction to Business and Management 1* (3 QH) All Quarters

Examines the setting and general structure of American business, including objectives and practices affecting the American standard of living. Topics include the characteristics of private enterprise and the nature and challenge of capitalism and other forms of economic enterprise. Introduces

*This is a University College course offered at a

types of businesses, the structures of organizations, and the functions of management. Considers what a managerial career involves, what problems must be faced, and what decisions must be reached. *Prereq. None.*

Management Science

MS 4332 Statistical Quality Control*

(3 QH) Winter

Offers a practical course in analytical methods of modern quality control, emphasizing the application of basic statistical controls in the industrial environment. Topics include control charts, statistical tolerancing, acceptance sampling techniques, life testing, and reliability concepts.

Prereq. ECN 4251 or equiv.

Mathematics

MTH 4006 Technical Mathematics

(4 QH) All Quarters

Reviews high school algebra equations, formulas, exponents, polynomials, factoring, scientific notation, fractions, radicals, complex numbers, quadratic equations, and linear equations. (Credit cannot be used in the associate in engineering, associate in science, or the bachelor of engineering technology degree programs.) *Prereq. None.*

MTH 4107 College Algebra

(4 QH) All Quarters

Offers a diagnostic exam to insure the proper placement of students in the course. Course topics include interval notation, integer and rational exponents, factoring, operations with fractional expressions, operations with radicals and complex numbers, Pythagorean theorem, linear and quadratic equations and inequalities, distance and midpoint formulas, and functional notation. Also covers graphing of functions including straight lines, absolute value, polynomials, exponential and logarithmic; solving equations involving radicals; and solving polynomial, exponential, and logarithmic equations. Involves use of scientific calculator. *Prereq. Math diagnostic exam or MTH 4006 or equiv.*

MTH 4108 Pre-Calculus

(4 QH) All Quarters

Examines trigonometric functions of angles in degrees and radians; trigonometric identities and

equations; right triangles; law of sines and cosines; inverse trigonometric functions; polar coordinates; complex numbers in trigonometric form; systems of linear and nonlinear equations; determinants; binomial theorem; arithmetic and geometric sequences and series; and conic sections.

Prereq. MTH 4107.

MTH 4120 Calculus 1

(4 QH) All Quarters

Studies plane analytic geometry of the line and circle. Reviews inequalities and general function operations, theory and evaluation of limits, derivatives of algebraic and trigonometric functions, general rules of differentiation, Rolle's theorem, and Mean Value theorem. Also covers applications of differentiation including velocity; and acceleration, related rates, maximum, minimum, curve sketching, and approximations by differentials. Examines solving the equation $f(x) = 0$ by applying Newton's method.

Prereq. MTH 4108.

MTH 4121 Calculus 2

(4 QH) All Quarters

Examines antiderivative and development of the fundamental theorem with applications to areas, volumes, and rectilinear motion problems. Topics include the logarithmic exponential and inverse trigonometric functions and their applications; techniques of integration including parts, partial fractions, substitution, and the use of tables; numerical integration (Simpson's and Trapezoidal rules); L'Hospital's Rule; improper integrals; and the geometry of vectors in a plane and space.

Prereq. MTH 4120.

MTH 4122 Calculus 3

(4 QH) All Quarters

Studies three-dimensional space and a treatment of functions of several variables; multiple integrals with applications in areas and volumes; sequences and series; and differential equations, including the solution with applications of first-order with variables separable, first-order linear, and second-order linear homogeneous to complete the sequence.

Prereq. MTH 4121.

MTH 4123 Differential Equations

(4 QH) Fall, Winter, Spring

Examines linear differential equations with constant coefficients, homogeneous and nonhomogeneous. Explores the variation of parameters and undetermined coefficients and simultaneous differential equations, the Laplace transform, series solution of differential equations, and the Fourier series. Studies orthogonal functions and numerical solutions of differential equations.

Prereq. MTH 4122.

*This is a University College course offered at a different tuition rate.

Physics

PHY 4101 College Physics 1**(4 QH) Fall, Summer**

Introduces students to mechanics, including units of measurement, vectors, accelerated motion, and Newton's laws of motion. Topics include conservation of energy, work, momentum, elements of heat, mechanical waves, and vibrating bodies. Includes laboratory experiments and classroom demonstrations as an integral part of the course. (This course is intended for health professions and science programs and cannot be used for credit towards technology degrees in the School of Engineering Technology.) *Prereq. None.*

PHY 4102 College Physics 2**(4 QH) Winter, Summer**

Introduces magnetism, magnetic fields, electromagnetic induction, electrostatics and electric circuits. Discusses appropriate topics in optics, nuclear and atomic physics. Involves frequent laboratory experiments and classroom demonstrations. (This course is intended for the health professions and science programs and cannot be used for credit towards technology degrees in the School of Engineering Technology.) *Prereq. PHY 4101.*

PHY 4117 Physics 1**(4 QH) All Quarters**

Introduces vectors and balanced forces, accelerated motion, Newton's laws, projectile motion, work and energy, momentum, angular motion, centripetal force, rotation of rigid bodies, and moment of inertia. *Prereq. MTH 4107 or concurrently.*

PHY 4118 Physics 2**(4 QH) All Quarters**

Explores elasticity, density and pressure, temperature, the gas laws, heat transfer, thermodynamics, vibratory motion, wave motion, properties of sound, and properties of light. *Prereq. PHY 4117.*

PHY 4119 Physics 3**(4 QH) All Quarters**

Covers electric forces and fields, electric potential, direct current circuits, magnetic forces and fields, electromagnetic induction, and alternating current circuits. *Prereq. PHY 4118.*

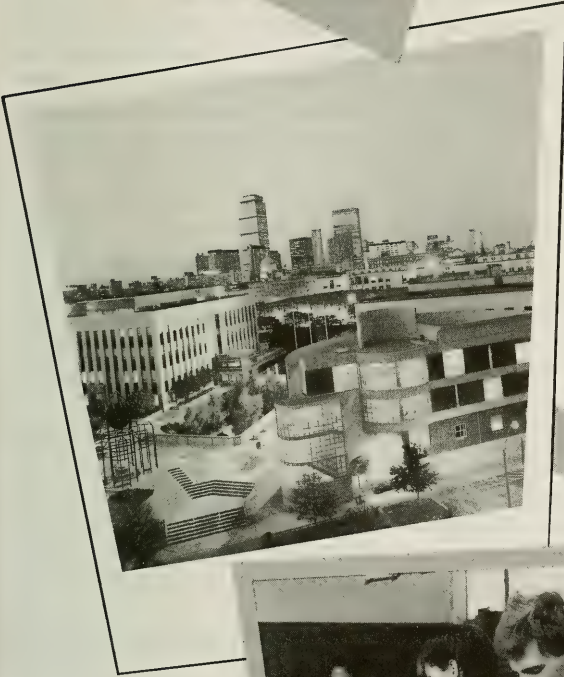
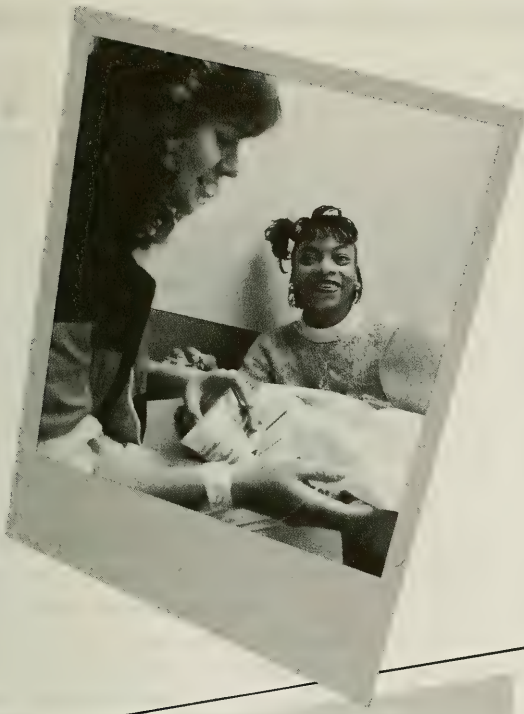
PHY 4173 Physics Laboratory 1**(2.3 lab, 2 QH) Winter, Summer**

Offers experiments in mechanics, elastic deformation, work, energy, thermometry, and calorimetry. *Prereq. PHY 4117.*

PHY 4174 Physics Laboratory 2**(2.3 lab, 2 QH) Spring, Summer**

Continues PHY 4173. Offers experiments in gas laws, wave motion, optics, electrical circuits, and nuclear and atomic physics. *Prereq. PHY 4173.*

Northeastern University



A Profile of Northeastern

At Northeastern University, we value part-time evening and weekend students as highly as we do our full-time students. You are important members of the academic community and reflect the changing profile of today's college student, which encompasses new concerns for lifelong learning and professional retraining. Northeastern supports your pursuit of personal and professional goals and wants to contribute to your success. In return, you contribute to the intellectual and cultural diversity upon which this urban institution thrives. You may take full advantage of the academic resources and facilities we offer and join all our students who are recognized and supported by the University's faculty and administration.

Founded in 1898, Northeastern University is incorporated as a privately endowed, nonsectarian institution. From its beginning, the University's mission has been to identify and address the educational needs of a diverse community and student body in distinctive and useful ways. Northeastern did not duplicate the programs of other academic institutions, but instead became a world leader in new areas of educational service. Today, the University is comprised of eight undergraduate colleges and ten graduate schools. Our undergraduate colleges are:

- Boston-Bouvé College of Human Development Professions
- College of Arts and Sciences, including the School of Journalism
- College of Business Administration
- College of Computer Science
- College of Criminal Justice
- College of Engineering, including the School of Engineering Technology
- College of Nursing
- College of Pharmacy and Allied Health Professions

Our graduate schools are:

- Graduate School of Arts and Sciences
- Graduate School of Boston-Bouvé College of Human Development Professions
- Graduate School of Business Administration

- Graduate School of Computer Science
- Graduate School of Criminal Justice
- Graduate School of Engineering
- Graduate School of Nursing
- Graduate School of Pharmacy and Allied Health Professions
- Graduate School of Professional Accounting
- School of Law

At Northeastern, we respond to the needs of people who already hold jobs or are launched in careers but who wish to advance or change their professional lives. There are also classes for people pursuing personal interests. The University offers a variety of educational options—both credit and noncredit—to suit your particular objectives. The School of Engineering Technology offers part-time evening and weekend associate's and bachelor's degree programs in technological areas, in addition to daytime undergraduate programs. University College, so named because it draws upon the resources of Northeastern's other colleges, offers part-time day and evening programs leading to certificates and to associate's and bachelor's degrees.

All formal courses of study leading to degrees through part-time programs are approved by the full-time day faculty of Northeastern's Basic Colleges and are governed by the same qualitative and quantitative standards.

Where You'll Find Northeastern

The main campus of Northeastern University is a vibrant and progressive urban community. To all Northeastern students, the physical setting of the Boston campus extends opportunities to participate in the dynamic, exciting environment that we share with city residents. Built around a quadrangle, the campus is divided by Huntington Avenue, a major artery. It is located in the midst of such cultural landmarks as Symphony Hall, the Museum of Fine Arts, the Isabella Stewart Gardner Museum, Horticultural Hall, and the

Boston Public Library. You can walk to Frederick Law Olmsted's Fenway Park, Copley Place, the Back Bay shopping district, and a number of internationally renowned hospitals. In 1910, the University began construction on the first piece of land acquired at its present site; it is now more than fifty-five acres.

The Boston campus is ideally situated for easy commuting. The MBTA Orange and Green lines provide rail service to the heart of the campus. Use either the Orange Line's Ruggles Street station or the Green Line's Northeastern University stop along the Arborway Branch to arrive on campus. The MBTA also has numerous bus routes that run along Huntington and Massachusetts avenues, which are the two major city streets closest to the campus. Finally, if you need to drive to Northeastern, student parking is available at reasonable rates in University-owned parking lots.

To reach increasing numbers of students and to make participation in our programs as convenient as possible, Northeastern University has established a number of suburban campuses and branch locations, as well as several off-campus athletic facilities. The campuses and branch locations house administrative and classroom facilities for Northeastern's graduate, part-time day and evening, and continuing education programs. The University also maintains many affiliations to ensure access to facilities and specialized equipment available at other institutions and organizations.

One of Northeastern's most recent acquisitions is the twenty-acre Dedham campus, just north of Route 128. This facility houses the Center for Continuing Education and space for the College of Business Administration's High Technology MBA Program.

Near the junction of Routes 128 and 3 in Burlington is the Suburban Campus of Northeastern University. Part-time undergraduate courses in a variety of subject areas and part-time graduate courses in engineering and business administration are offered. The Burlington campus also offers special programs for part-time, evening, and noncredit continuing education courses.

Situated on fifty acres in Ashland, the Warren Center provides a practical laboratory for outdoor education and conservation and for camping administration, programming, and counseling. In the summertime, the center becomes an attractive campsite for various community and University groups and is available for conferences and workshops.

Twenty miles northeast of Boston, the Marine Science and Maritime Studies Center is located in Nahant, on Massachusetts Bay. It serves as a site for national, international, and University research.

Henderson House, Northeastern University's conference center, is located twelve miles from Boston in suburban Weston. This facility hosts a variety of activities, including residential seminars, workshops, short courses, and weekend meetings.

Network Northeastern

A unique extension of the University is available to you via Network Northeastern. The network uses the microwave-based Instructional Television Fixed Service (ITFS) system to telecast live classroom instruction (in color) on four channels from the Boston campus to off-campus students within a forty-mile radius. Telecasts are delivered daily between 8 AM and 10 PM. Current Network Northeastern course offerings include graduate engineering, graduate computer science, state of the art professional development courses, undergraduate engineering technology, arts and sciences, and noncredit one- and two-day seminars.

At thirty-eight company sites and two suburban campuses, students view the telecasts in reception rooms equipped with television monitors and a telephone-based talkback system. Thus, students off campus can participate as fully as those on campus. A courier service collects and delivers homework assignments and serves as the off-campus student's link to the bookstore, registrar, and other Northeastern offices.

University Libraries

As a reflection of our serious commitment to part-time students, you have full access to the University Libraries located on the Boston, Burlington, and Dedham campuses and at the Marine Science Center in Nahant.

During summer 1990, a central library for the Boston campus opens for service; it is the largest academic library building in Boston. A five-level structure with 2,700 seats and shelving for more than 1.25 million volumes, the library's capacities for both seating and on-site

collections are triple those of the previous main facility. The new library houses the latest in on-line, telecommunications, and media resources, including computer-assisted instruction, microcomputer facilities, and language and music listening laboratories.

Total holdings of the University Libraries include more than 600,000 volumes, 1,400,000 microforms, current subscriptions to over 6,400 serials and newspapers, 250,000 government documents, and 15,000 audiovisual and computer software titles.

Library staff are available in all service areas to assist students. Librarians provide instruction to groups and individuals on the bibliographic research process and on strategies for locating and using library resources. Each quarter, a series of tutorials gives students further opportunities to meet with a librarian and discuss individual research needs.

Northeastern University's membership in the Boston Library Consortium generally entitles our students to on-site use of libraries at Boston College; Boston Public Library; Boston University; Brandeis University; the Massachusetts Institute of Technology; the Massachusetts State Library; Tufts University, the University of Massachusetts at Amherst, Boston, and Worcester; and Wellesley College.

Engineering Computer Center

The Engineering Computer Center provides user support for Northeastern Engineering and Technology students and faculty. The staff are full-time professionals who administer the systems, deliver training, maintain hardware and provide software support. The center's labs, open seven days a week with competent user assistants available to answer questions, provide student access to PCs, Macintoshes, VAX and Sun Microcomputers, and high-end workstations for CAD and VLSI design.

Division of Academic Computing

The Division of Academic Computing (DAC) facilitates the use of computers by Northeastern students and faculty.

The division's Personal Computing Initiative supports personal computing with negotiated

discounts on hardware and software (available through the Northeastern Computer Store) and with advice, training, and assistance on personal computer use.

The division and its Computing Resource Center (CRC) maintain the *lynx* communication system for the exchange of computer mail and conference discussions. Participation in *lynx* is available to any member of the Northeastern community free of charge. To apply for a *lynx* account, bring a valid Northeastern student identification card to 39 Richards Hall during business hours.

The Computing Resource Center also maintains mainframe computing resources (most notably the VAX 8650 system) and numerous public-access laboratories of personal computers and terminals on the Boston, Dedham, Burlington, and Liberty Square campuses. ACCESS, the newsletter of the division, appears seven times a year and includes the locations and facilities of the laboratories and news about other DAC and CRC services.

Ell Student Center

Students enjoy a variety of recreational and co-curricular activities at the Carl S. Ell Student Center. The center houses Blackman Auditorium, which seats 1,300; a ballroom; main lounge; student offices; conference rooms; PC lab and typing room; full-service copy center; gameroom; cafeteria with seating for more than 1,000; and the University Bookstore.

Sport, Dance, and Exercise Facilities

Northeastern is concerned with providing for the health and fitness of students and continually expands the sports, exercise, and recreational options available. All part-time students have access to extensive gymnasium facilities from 4:00 PM to 9:30 PM, Monday through Friday, and during all open hours on Saturday, Sunday, and holidays. The University offers a variety of specialized facilities, including basketball courts, dance studio, indoor athletic field and running track, gymnastics room, combatives room, weight-training rooms, swimming pool, crew practice tank, racquetball courts, tennis

courts, and motor performance and exercise physiology laboratories. The Matthews Arena, with seating for more than 5,000 fans, is home to the University's varsity and subvarsity hockey and basketball teams.

For organized athletics requiring facilities not available on the main campus, Northeastern maintains the Northeastern University Boat House, which is located on Memorial Drive in Cambridge and is home to the University's crew teams. The Edward S. Parsons Field, on Kent Street in Brookline, is the playing ground for the football, baseball, women's lacrosse and women's field hockey teams, and some intramurals. The Bernard M. and Jolane Solomon Track, a recently completed outdoor track and field facility in Dedham, has an eight-lane, Action Trak 200 running surface and an expansive area for concurrent jumping and field events. This new facility is ready to host dual and championship meet competitions and is a permanent site for Northeastern University track athletes.

You must present a valid Northeastern student identification card and a photo identification card for access to the facilities.

Social and Professional Clubs

We welcome and encourage part-time students in the School of Engineering Technology and University College to join in the social and professional activities that are organized and run by the student body, with the assistance of the director of the Office of University College-School of Engineering Technology Student Activities. If you and your peers are interested in starting new professional clubs, the office will help to plan and organize locally and nationally.

All programs are designed to keep pace with changing student needs and interests and to provide maximum opportunity for your participation.

Office of Services for the Handicapped

No student should miss or have diminished any of the opportunities at Northeastern. Any student who has a disability-related need, no matter how small or individual, can receive ready support

services from the Office of Services for the Handicapped (OSH). Frequently, students are uncertain about how they may be helped by this office; in these situations, a discussion of possible alternatives is useful. OSH provides a range of support services to eliminate the competitive disadvantages that a disability may create. Services are tailored individually to meet the needs of each student.

The OSH provides support during orientation, registration, and preregistration; an information clearinghouse; counseling; and services for the hearing-impaired, the wheelchair user or mobility-impaired, and students who are learning disabled.

The OSH is also the gathering place for the Disabled Student Organization of Northeastern University, which works cooperatively with OSH to plan programs and improve accessibility of services for people with disabilities at Northeastern.

Counseling and Testing Center

Confidential counseling and testing is available to full- and part-time students to address career, educational, or personal concerns. Assistance is available to all students during days and certain weekday evenings until 8:30 PM at the Counseling and Testing Center. For information and appointments, call 617-437-2142 or drop in at 302 Ell Building.

Lane Health Center

A comprehensive program of medical care is provided to all students registered in full-time Basic Colleges and Graduate School programs at the Lane Health Center, 135 Forsyth Building. There are staff physicians available on a walk-in basis Monday-Friday 9:00 AM-4:30 PM and a nurse is on duty at all times when the clinic is closed. An emergency telephone number 617-437-2772 is answered by the nurse on duty who will make appropriate arrangements for any urgent situation, nights, weekends and holidays.

Department of Career Development and Placement

The Department of Career Development and Placement provides a variety of professional development services to Northeastern students and alumni. The services enable students to plan for career advancement. Students already working in their chosen fields may receive assistance in identifying career paths and developing a network of professional contacts. Others may receive assistance with career placement.

The department is located on the Boston campus in 124 Ryder Hall. Counselors are available to students and alumni by appointment in Boston, and travel to the Burlington and Dedham campuses as well. For an appointment, call 617-437-2428. Office hours from September to June are 8:30 AM–4:30 PM Monday, Thursday, and Friday; and 8:30 AM–8:00 PM Tuesday and Wednesday. Office hours during July and August are 8:00 AM–5:30 PM, Monday through Thursday.

Free services are available to students and alumni and include career counseling and placement, a reference library with company files and employer contacts, an annual Career Expo during evening hours, a job bank of current employment opportunities, seminars and panels, and on-campus corporate recruiting for seniors.

Alumni Association

Upon graduation, you will join the more than 114,000 alumni united within the Alumni Association, which was established to promote a mutually rewarding relationship between Northeastern and its graduates. Association activities include the Homecoming celebration, presentation of the Outstanding Alumni Awards, and the annual presentation of Professional Promise Awards to outstanding seniors in each of the colleges.

Cooperative Plan of Education

The University is known worldwide for its Cooperative Plan of Education, under which students alternate periods of work and study. Our time-tested, widely acclaimed method of education enables students to gain valuable hands-on, practical experience in their chosen fields as an integral part of their college programs. The Co-op Plan also allows students to earn money that is used to offset tuition, or related costs. All of Northeastern's undergraduate day colleges operate on the Cooperative Plan, and several of the University's graduate schools have structured their programs to include the features of cooperative education.

Administrative Information

Admissions

The Student Body

The student body of the School of Engineering Technology is composed of both recent high school graduates and adults. Most students are employed in industry, with a range of vocational experience. They represent many technical career categories—industrial, engineering, scientific, and allied-medical, demonstrating that, in our increasingly complex society, the key to personal advancement is education.

Academic Background

A firm knowledge of the fundamentals of mathematics and science is necessary for success in the more advanced technological courses.

All applicants to the School of Engineering Technology are required to be proficient in both English and mathematics. In order to enroll in ENG 4110 Critical Writing 1 or MTH 4107 College Algebra, you must satisfactorily complete an English and a mathematics skills test.

Students who lack the required English or mathematics skills must take the appropriate review course. In addition, students who feel uncomfortable with the level of their English or mathematics skills are encouraged to enroll in review courses as well. The next paragraphs describe the review courses available at the School of Engineering Technology. The review courses are offered on a noncredit basis only.

ENG 4005, ENG 4006, and ENG 4007 English for International Students 1–3

This is a three quarter sequence of courses for foreign speaking students that provides intensive training in the English language. Students are introduced to English grammar, with an emphasis on listening, speaking, and writing. The preparation of written and oral reports, as well as business and social correspondence, is required. In the final quarter, advanced work in

written and spoken English prepares the students for ENG 4110 Critical Writing 1.

ENG 4011 Elements of Writing

This is a writing course that reviews English grammar, and offers practice in writing sentences, paragraphs, and short papers. The course prepares students for ENG 4110 Critical Writing 1.

MTH 4006 Technical Mathematics

This is a mathematics course that reviews high school algebra and prepares students for MTH 4107 College Algebra.

Program Counseling

If you are attending the School of Engineering Technology for the first time, we recommend that you meet with a program counselor who will assist you in planning an academic program. (If possible, please bring school transcripts to the counseling session.) Counselors are available evenings and Saturdays at the main campus in Boston most of the year; a special schedule is prepared for the summer. Counseling at the Burlington campus is scheduled at the beginning of each quarter. For further information, contact the School of Engineering Technology at 617-437-2500.

Special Students

Our open enrollment policy allows you to enroll in courses without making a formal application. As long as you have the proper prerequisites or their equivalent, you can enroll as a special student.

Degree Candidates

To graduate from the School of Engineering Technology you must be accepted as a degree candidate in a program. An application for degree candidate status is available from the

School of Engineering Technology office in Boston (120 Snell Engineering Center, 617-437-2500) and from our representative in Burlington.

To declare a major, you must do the following.

1. Complete sixteen quarter hours in the School of Engineering Technology degree program at a minimum cumulative quality-point average of 2.00 (a grade of C).
2. Present a high school diploma or its equivalent (GED).

Once your application for admission to a degree program is approved, a change of status will be recorded on your permanent record and any advanced standing credit will be posted.

Full-Time Students

In addition to the part-time programs described in this publication, the School of Engineering Technology offers full-time day cooperative education programs. Interested students can apply through the Office of Undergraduate Admissions, 617-437-2200.

Readmission

If you are a former student seeking readmission to the School of Engineering Technology, we suggest you schedule a meeting with a program counselor to determine how program changes may affect course requirements. We recommend that you bring a copy of your previous curriculum worksheet and a transcript.

Transfer Students and Advanced Standing Credits

If you are transferring from a community college, junior college, technical institute, or other college or university, you may transfer applicable credits toward the degree requirements of a program in the School of Engineering Technology.

If you are admitted with transfer or advanced standing credits from another institution, you must meet the requirements for admission as set forth under the regulations stated. (See "Degree Candidates.") Advanced standing in the School of Engineering Technology may be obtained by transfer of credits, proficiency examination, or by completing the College Level Examination Program (CLEP).

Transfer of Credits

You may receive, subject to the approval of the Academic Standing Committee, credits for academic work completed in other approved schools, colleges, or universities if the following criteria are met: the content of the course being submitted is equivalent to that of the corresponding School of Engineering Technology course; the grade achieved in the course submitted is C or higher; and the remoteness of the time of study does not negate its use as a prerequisite for an advanced course.

If you desire advanced standing credits by transfer, you must file a petition for transfer credit. You should request the registrar of the institutions previously attended to mail an official transcript to the School of Engineering Technology office, 120 Snell Engineering Center, Boston, Massachusetts 02115.

Proficiency Examinations

If you are a degree candidate in good academic standing and you do not meet all the criteria for the normal transfer of credits but are able to supply evidence of sufficient knowledge of a technical subject, you may petition the Academic Standing Committee for a proficiency examination. After paying the proficiency examination fee and demonstrating proficiency as indicated by the examination, you will receive advanced standing credit.

College Level Examination Program

The School of Engineering Technology awards college credit under the College Level Examination Program (CLEP). This program is designed to enable individuals who have reached college-level education to demonstrate their achievement through testing and to receive college credit applicable toward a degree program. (The examination measures basic proficiency in the arts and sciences.) After paying the exam fee and receiving a passing score, you will be awarded advanced standing credits. For further information, contact the School of Engineering Technology, 617-437-2500.

Registration

Selecting Courses During Registration

Courses offered by the School of Engineering Technology are listed in the "Course Descriptions" section of this *Bulletin*. (See page 33.) Part of

each course's entry includes a listing of which quarters the course is offered. Because most courses are not offered every quarter, you should plan your course load for the entire academic year, not just the next quarter. Academic counseling is available to help plan your course load for the year. If you need help, contact a School of Engineering Technology program counselor at 617-437-2500.

Guidelines for Registering for Electives

Many of the School of Engineering Technology's degree programs require the completion of electives. The electives give you the chance to explore topics beyond the core curriculum's scope or to gain expertise in a specific area introduced by the core courses.

There are three categories of electives: open, technical, and social science/humanities.

Open Electives

Any course is acceptable as an open elective except physical education, military science, and preparatory courses. An open elective may be either a three or a four quarter-hour course.

Social Science/Humanities Electives

Social science/humanities electives are offered through University College and must be chosen from a list that is available from the School of Engineering Technology. Six quarter hours of the social science/humanities electives must be chosen from the speech communications (SPC) category.

Technical Electives

Technical electives must be chosen from the list of suggested technical electives appearing at the end of the degree curricula. Students wishing to take an upper-level course that does not appear on the list must petition for permission before attending the class. Students should submit a proposed program of elective courses for approval by the program coordinator. Electives preferably represent a minor field of concentration consistent with personal career objectives.

Registration Periods

Official registration periods are scheduled for each quarter during the academic year. We strongly recommend that you register for courses during these periods. The registration dates, times, and locations are listed in the enclosed Fee Schedule and Academic Calendar.

Before the registration period begins, get a copy of the *University College and School of Engineering Technology Schedule* for the next quarter. The *Schedule* provides you with the meeting times and locations of the courses being offered during the next quarter. To get a copy of the *Schedule*, contact the School of Engineering Technology at 617-437-2500.

Changes in Registration

You can change the courses you are registered in by filing a course drop form at the registrar's office, 120 Hayden Hall, and then registering for the desired course. We suggest that you make these changes during the official registration period, if possible.

Cross-Registration

Basic College students registering for School of Engineering Technology part-time courses may do so only to clear deficiencies or to follow a program approved by the appropriate program coordinator. Basic College students may register for part-time courses only by completing the registration form available in the School of Engineering Technology office by the end of the first week of the quarter. You must *not* fill out any other part-time registration materials. Approval of the program coordinator must be obtained if the course does not appear on your approved program sheet. Approval from the Department of Cooperative Education is required if you take more than one course during a co-op term. Upon completion, approval, and submission of the registration form, you will be registered automatically for the course. If the course is a substitute for a day course, the latest grade received is considered for quality-point calculations. If you do not appear on the part-time roster you will not be admitted into the class unless you have an approved registration form. In all instances, Basic College students must adhere to the academic and administrative requirements of the School of Engineering Technology part-time course.

Part-time School of Engineering Technology students who have been enrolled at Northeastern University for one or more quarters are eligible to register for a limited number of Basic College day courses. This policy is designed to accommodate previous School of Engineering Technology students who have experienced employment changes that make it impossible for them to continue part-time studies. If you are eligible, you

may register for eight quarter hours of day course credit per quarter for a maximum of three academic quarters. Since you will be a part-time evening student in Basic College courses, tuition, fees, student services, and space availability will be based on part-time rates and departmental policy. If you are interested, you must first determine if a specific course is offered in the University, complete the registration form in the School of Engineering Technology, and have the form approved in both the bursar's and registrar's offices. At this point the academic department will determine space availability.

Academic Standards

Campus Locations

All courses are offered at the main campus in Boston, with some courses available at the Suburban Campus, Burlington; Burlington High School; the Dedham campus; and Marlboro High School. Refer to the "Campus Maps" section. (See page 84.)

Quarter Calendar

Northeastern University operates on a quarter-system calendar. All courses are evaluated in terms of quarter-hour credit. A quarter-hour credit is equal to three-fourths of a semester-hour credit.

Class Session

Classes at Northeastern are scheduled in different modules. In assessing quarter-hour weight for courses, the following statement applies: One quarter hour of credit is equal to approximately fifty minutes of instruction per week, plus two hours of individual study.

Coursework

Various methods of instruction will be used in the course of your studies: lectures, home assignments, class projects, laboratory work, irregularly scheduled quizzes, and formal examinations. In addition, you will complete midterm examinations in most courses and a final examination at the completion of all courses. You are responsible for fulfilling all the

requirements of a course. In the event of absence, you must make appropriate arrangements for makeup with the instructor.

Attendance

Chronic absence from regularly scheduled sessions in any subject, for whatever reason, may seriously jeopardize your academic progress and status. You are expected to attend all sessions scheduled in your courses. Excessive absence during a quarter may be sufficient cause for the registrar to remove the course(s) from your schedule.

Withdrawal

Students who wish to withdraw from a course must complete a Course Drop Form, available at any campus location. Ceasing to attend classes or notifying the instructor does not constitute official withdrawal from a course. Students who withdraw from a course prior to the end of the seventh week of a term (please refer to the specific deadline in each *Schedule Guide*) will have no record of the withdrawal on their transcripts. Students may withdraw from the beginning of the eighth week to the end of the week prior to final examinations but the withdrawal will be noted on their transcripts. No withdrawals will be allowed for any reason during the week that final examinations are given.

In addition, the registrar will withdraw you from a course if you do not attend the first three classes at the beginning of a quarter or the first two classes at the beginning of a summer term.

Grading Systems

You are required to maintain appropriate grades, quality-point average, and the quantitative credit requirements of your program to satisfy academic progress criteria and graduate from the School of Engineering Technology.

The following grading system is used. The numerical equivalent for each grade is in parentheses.

| | | |
|-----|---------|-------------------------|
| A | (4.000) | Outstanding Attainment |
| A - | (3.667) | |
| B + | (3.333) | |
| B | (3.000) | Good Attainment |
| B - | (2.667) | |
| C + | (2.333) | |
| C | (2.000) | Satisfactory Attainment |
| C - | (1.667) | |

| | | |
|----|---------|---|
| D+ | (1.333) | |
| D | (1.000) | Poor Attainment |
| D- | (0.667) | |
| F | (0.000) | Failure |
| I | — | Incomplete |
| L | — | Audit (No Credit) |
| S | — | Satisfactory achievement in a pass-fail course; counts toward total degree requirements |
| U | — | Unsatisfactory achievement in a pass-fail course |
| X | — | Incomplete in a pass-fail course |
| * | — | Grade not received |

A general average of \dot{D} is unacceptable and will not allow you to continue in the School of Engineering Technology or to receive a degree from Northeastern University. If you receive an F, you can clear the failure by repeating and passing the course.

Pass/Fail Courses

If you are a *degree candidate* in good academic standing and have completed forty quarter hours in a School of Engineering Technology degree program, you may register for one pass/fail course. Thereafter, you may register for one course on a pass/fail basis for each ten quarter hours of successfully completed work up to a maximum of nine quarter hours of pass/fail credit. You must obtain written permission from the appropriate academic dean or designee and approval of the instructor. You may not register for more than one pass/fail course per quarter. Pass/fail courses are restricted to social science/humanities electives only.

If you are a *nondegree candidate*, do not intend to become a degree candidate, and are making good academic progress, you may register for a course on a pass/fail basis with written permission from the appropriate academic dean or designee and approval of the instructor. You may not register for more than one pass/fail course per quarter.

If you become a degree candidate, you may use only nine quarter hours of social science/ humanities elective credit, where applicable.

Auditing a Course

You can audit courses by filing the usual registration forms and paying the regular tuition fees. There is no reduction in fees for auditing. Your decision to audit must be communicated in writ-

ing to the registrar prior to the fourth class meeting. As an auditor, you may participate in class discussion, complete papers and projects, and take tests and examinations for informal evaluation if desired. However, regardless of the amount or quality of work completed, *no academic credit will be granted at any time for courses audited.*

Makeup Examinations

Midterms

If you are absent from a midterm examination, you may petition for a makeup examination; you do not automatically have the right to make up a missed examination. You must file a petition for a missed midterm in accordance with the published schedule. Petitions may be obtained from the School of Engineering Technology office, 120 Snell Engineering Center, 617-437-2500.

If the petition is granted, you will be notified by mail when and where to make up the examination. All examinations are administered on the Boston campus. If you do not take makeup midterm examinations as scheduled you will forfeit the privilege. *There is no fee for a midterm makeup.*

Finals

If you are absent from a final examination, you will receive a grade of I (Incomplete) for the course. You do not automatically have the right to make up a missed final examination; you must file a petition for a missed final according to the published schedule. Petitions may be obtained from the School of Engineering Technology office, 120 Snell Engineering Center, 617-437-2500.

If the petition is granted, *you must pay a fee before taking the special examination.* (See enclosed Fee Schedule and Academic Calendar.)

You will be notified by mail when and where to take the final examination; all are administered on the Boston campus. If you do not take makeup final examinations as scheduled, you will forfeit the makeup privilege.

Grade Reports

The registrar's office will mail you a grade report that indicates both the quarterly quality-point average and the cumulative quality-point average. University regulations prohibit issuing grades by telephone.

Quality-Point Average

The quality-points you earn in a given course are determined on the basis of your letter grade and the credit hours carried by the course. The total quality-points earned, divided by the total number of credit hours, constitutes the quality-point average.

- 1. When you receive more than one grade in the same course, the most recent grade will be used to calculate a quality-point average.
- 2. A grade of I (Incomplete) will not be considered in the final calculation.
- 3. If you are a transfer student, you can receive advanced standing credits (ASC) for work completed at other institutions. While these credits count toward completion of credit requirements, neither the credits nor the grades earned in such courses are included in quality-point averages.
- 4. In programs made up of combined University College and School of Engineering Technology courses, your cumulative quality-point average will include all work in both colleges.

For example, if you have registered for thirteen courses, cleared a failure in one of them, cleared an incomplete in another by repeating the course, and received advanced standing credit in another, you may calculate the quality-point average as follows.

| Grade Achieved | Numerical Equivalent | × | Credit Hours | = | Quality Points |
|----------------|----------------------|---|--------------|---|----------------|
| A | 4.000 | × | 4 | = | 16.000 |
| A – | 3.667 | × | 3 | = | 11.001 |
| B + | 3.333 | × | 3 | = | 9.999 |
| B | 3.000 | × | 4 | = | 12.000 |
| B – | 2.667 | × | 2 | = | 5.334 |
| C + | 2.333 | × | 2 | = | 4.666 |
| C | 2.000 | × | 4 | = | 8.000 |
| C – | 1.667 | × | 3 | = | 5.001 |
| D + | 1.333 | × | 2 | = | 2.666 |
| D | 1.000 | × | 3 | = | 3.000 |
| D – | 0.667 | × | 2 | = | 1.334 |
| F | 0.000 | × | 2 | = | 0.000 |
| FB | 3.000 | × | 3 | = | 9.000 |
| I | – | × | – | = | – |
| IC | 2.000 | × | 2 | = | 4.000 |
| ASC | – | × | – | = | – |
| Totals 39 | | | | | 92.001 |

QPA = $\frac{\text{Total Quality Points (92.001)}}{\text{Total Credit Hours (39)}} = 2.359$

The registrar cannot confirm calculations of quality-point averages. Each student's record is updated before graduation. In the meantime, borderline cases can be checked by a School of Engineering Technology counselor.

Academic Progress Criteria

You are expected at all times to strive for a high record of achievement. The Academic Standing Committee reserves the right to review all students' records and deny readmission to those who fall below a minimum quality level of achievement. This requirement has been established as follows.

In order to remain in the college, you must have a quality-point average of 1.40 at the completion of twenty-four quarter hours; 1.50 at the end of forty-eight quarter hours; and 1.60 at the end of seventy-two quarter hours.

If you accumulate the equivalent of six uncleared failures, you may be considered ineligible to continue your program of study.

Scholastic Probation

The Academic Standing Committee has the authority to dismiss from the school or to place on scholastic probation any student whose scholarship is deficient because of a low quality-point average or excessive outstanding failures, regardless of quality-point average.

A student on scholastic probation should be particularly diligent in current course work and make every effort to clear the academic deficiencies as soon as possible. Students whose academic records do not improve or whose failures are not properly cleared may not be allowed to register for further courses.

A student on scholastic probation who has cleared all or a substantial part of any outstanding failures may petition the Academic Standing Committee for removal from the probation list.

Disciplinary Probation

The Academic Standing Committee has the authority to dismiss from the school or place on disciplinary probation any student who is deemed unworthy because of conduct or character. The committee may ask any student to withdraw from the school who is obviously out of sympathy with its aims and ideals.

Graduation Requirements

To receive the degree of associate in engineering, associate in science, or bachelor of engineering technology, you must meet the following requirements.

1. Formal acceptance into degree candidate status by the Committee on Admissions.
2. Completion of all curriculum courses, either by attendance at the School of Engineering Technology or by receiving advanced standing credit.
3. Completion of associate degree programs within eight years and bachelor's programs in twelve years from the date of entrance into the School of Engineering Technology (extensions of time may be granted by the Academic Standing Committee).
4. Attendance for at least a year preceding the expected graduation date, and completion of at least one-fourth of the work in the School of Engineering Technology.
5. Maintenance of a minimum quality-point average of 2.00 in all courses in the major and a minimum overall quality-point average of 2.00.
6. Completion of a minimum of thirty quarter hours of additional credit to be awarded more than one associate or bachelor degree.
7. Payment of the commencement fee. (See enclosed Fee Schedule and Academic Calendar.)
8. You must petition for transfer of credits completed at other institutions prior to January 1 of the year in which you are to receive the degree.

Academic and Professional Awards

The academic programs offered by the School of Engineering Technology and the teaching, counseling, and professional efforts of the faculty and staff are aimed at motivating you toward the highest levels of academic achievement. To encourage scholarly and professional excellence and to recognize quality achievements, the following awards are made at appropriate times during the academic year.

Dean's List Scholars

All matriculated students maintaining honor grade averages—a minimum quality-point average of 3.00 and no grades below C during a quarter, while carrying a minimum of eight quarter hours of credit—are recognized as Dean's List Scholars. If you want a certificate attesting to this honor, contact the School of Engineering Technology office.

Graduation with Honor

Bachelor's degree candidates who have superior achievement will be graduated with honor, high honor, or with highest honor, depending on the final quality-point average as follows.

| | |
|-------------------------------|-----------|
| Graduation with honor | 3.25–3.49 |
| Graduation with high honor | 3.50–3.74 |
| Graduation with highest honor | 3.75–4.00 |

To be considered for graduation with honor, a student must have completed a minimum of 72 quarter hours of work at the School of Engineering Technology. Courses transferred from other educational institutions will not be considered in determining honor graduates.

Awards

University Awards

The University Awards are presented annually to seniors who have achieved high-ranking cumulative academic records. Certificates are awarded at the annual Class Day Ceremony.

Technology Awards

The Technology Awards are presented annually to seniors who have demonstrated superior academic and professional capabilities in their fields. Appropriate certificates are distributed to outstanding students enrolled in the following program categories.

Aerospace Maintenance Engineering
Technology
Computer Technology
Electrical Engineering Technology
Mechanical Engineering Technology
Mechanical-Structural Engineering Technology

Class Marshal Award

The Class Marshal Award is presented annually at the Class Day Ceremony to the top-ranking senior in a baccalaureate program. The award consists of a certificate and the President's Letter of Commendation.

Sigma Epsilon Rho Awards

This award is presented annually by Sigma Epsilon Rho, the evening colleges' scholastic honor fraternity. The highest-ranking students in University College and the School of Engineering Technology receive certificates and pins for outstanding scholastic achievement.

Tau Alpha Pi Awards

This award is presented annually by the Tau Alpha Pi National Engineering Technology Honor Society to recognize high scholastic achievement among students of the School of Engineering Technology. The award is intended to promote and encourage outstanding academic performance by offering membership in the society. Finally, the society hopes the award will strengthen the desirable qualities of personality, intellect, and character among its members. Inductees receive certificates and pins.

Alumni Award for Professional Promise

Established in 1947 by the Northeastern University Alumni Association, the Alumni Award for Professional Promise is presented annually at the Class Day Ceremony. The award is made to the senior who has demonstrated unusual professional promise through character traits, scholastic achievement, and professional performance.

Additional Opportunities at Northeastern

Educational Opportunities at Northeastern for Associate's Degree Graduates

Graduates of associate's degree programs in engineering technology or science technology programs may be able to transfer applicable credits toward the degree requirements of a baccalaureate program in engineering technology or industrial technology at Northeastern.

For information about transferring associate's degree credits toward an engineering technology bachelor's degree, call the School of Engineering Technology, 617-437-2500. For information about transferring associate's degree credits toward an industrial technology bachelor's degree, call University College, 617-437-2400.

In addition, engineering technology or science associate's degree graduates who maintained a quality-point average (QPA) of 2.75 may be able to transfer applicable credits toward a bachelor of

science in engineering degree. For information, call the College of Engineering's student services office, 617-437-2154.

Educational Opportunities at Northeastern for Bachelor's Degree Graduates

Bachelor of engineering technology graduates who maintained a quality-point average (QPA) of 2.75 may be qualified to enter the College of Engineering's program leading to the bachelor of science in engineering degree. For information, call the College of Engineering's student services office, 617-437-2154.

Financial Information

Tuition and Fees

This section contains a brief description of the fees and charges that the University assesses for instruction or other services. The actual fee amounts are listed in the enclosed Fee Schedule and Academic Calendar. If you do not have a Fee Schedule and Academic Calendar, you can request one by calling 617-437-2500.

Tuition rates, all fees, rules and regulations, courses, and course content are subject to revision by the President and the Board of Trustees at any time.

Registration and Tuition Fees

As a new student, you will be charged a one-time, nonrefundable registration fee. This fee is included in your tuition bill.

Students are permitted to audit courses, but there is no reduction in fees for auditing.

You may not attend class sessions or take any examination until you have paid your tuition or have made satisfactory arrangements for payment.

You will not be advanced in class standing, nor permitted to re-enroll in the University, nor have degrees conferred until all financial obligations to the University have been met.

If you are assigned to courses in other departments or colleges of the University, you will be charged tuition and other fees effective in those departments.

Deferred Payment Privilege

Occasionally situations develop, usually beyond the control of the student, that make it difficult to make regular payments. Under such circumstances, we recommend that you discuss the problem personally with the Office of the Bursar, where you can work out a convenient deferred payment agreement. A service fee is charged for this privilege. (See enclosed Fee Schedule and Academic Calendar.)

Late Payment Fee

A late payment fee is assessed on all accounts for failure to make payment or arrange for deferred payment by the bill due date.

Refund of Tuition

The general tuition refund policy in all schools and colleges of the University is as follows.

The University provides all instruction quarterly for which you must pay at the beginning of each quarter. Tuition refunds are granted for official withdrawal from a course through the first four weeks of a quarter.

Tuition refunds are granted only on the basis of the date appearing on the official withdrawal application filed with the registrar, 120 Hayden Hall. *Nonattendance does not constitute official withdrawal.* Requests for refunds must be made through the Office of the Bursar, 245 Richards Hall.

Refunds will be granted in accordance with the following schedule.

| <i>Official withdrawal filed within</i> | <i>Percentage of tuition</i> |
|---|------------------------------|
| 1st week of quarter | 100% |
| 2nd week of quarter | 75% |
| 3rd week of quarter | 50% |
| 4th week of quarter | 25% |
| 5th week or later | 0% |

Tuition Underwritten by Employers

If tuition is being paid directly by your employer to the University, you should give the Office of the Bursar a purchase order or a statement from an officer of the company, certifying that the company is underwriting the tuition.

Many companies, however, do not pay the University directly but will reimburse employees upon successful completion of each course. In such cases, you are responsible for payment in full at the start of each quarter.

You may choose to pay in installments on the deferred payment plan. However, tuition may not be left unpaid pending employer reimbursement.

Failure to make payments in accordance with these regulations will result in a late payment fee.

If you have any questions about student accounts, please direct them to the student account bursar, 245 Richards Hall, 617-437-2270.

Student Center Fee

If you attend the main Boston campus in the evening in a part-time program of study, you will be assessed a nominal student center fee.

Parking Registration Decal Fee

If you park in the Boston or Burlington campus lots, you must obtain a parking registration decal by the end of the second week of the quarter. You may pay the fee at the cashier's office, 248 Richards Hall, or at the Burlington campus cashier's office.

Medical Insurance

The Commonwealth of Massachusetts requires all Northeastern University students who are classified as full-time or enrolled in a degree program carrying nine or more credits to be covered by medical insurance. In compliance with the law, Northeastern University will automatically enroll you in its Blue Cross/Blue Shield plan and bill your student account for this coverage. The law allows you to waive the University's plan if you are covered by comparable medical insurance. Medical insurance waiver forms are available at the bursar's office, 245 Richards Hall.

Proficiency Examination Fee

Applicants may petition for advanced standing credit based on a "proficiency examination." There is a fee for each examination requested.

Graduation Fee

All candidates for associate's or bachelor's degrees must pay a graduation fee. The fee is billed whether or not you attend the Commencement Exercise.

Transcript Fee

You can obtain a transcript at the registrar's office, 117 Hayden Hall. There is no charge for an unofficial transcript. The official transcript fee is payable in advance at the cashier's office, 248 Richards Hall.

Textbooks and Supplies

You must purchase your own textbooks and work materials. The cost varies according to the subject. If you are enrolled in Engineering Graphics, you should be prepared to purchase drawing supplies and a set of drawing instruments, in addition to the textbooks.

Financial Aid and Scholarships

The Office of Financial Aid, located at 254 Richards Hall, offers several types of assistance to part-time students. All awards are based on financial need. Aid granted from programs sponsored by the federal government is dependent upon the amount of funding allocated to Northeastern University.

Pell Grants

The Pell Grant Program is a federal aid program designed to provide financial assistance to deserving students who wish to attend post-high school educational institutions. Pell Grants may be combined with other forms of aid in order to meet the full costs of education. The Pell Grant is an award and, unlike a loan, does not have to be repaid. A half-time student taking at least six credit hours each quarter and who is a United States citizen or an eligible noncitizen may apply. Applications are available in the Office of Financial Aid, 254 Richards Hall, 617-437-3190, or by writing to the Pell Grant Processing Center, P.O. Box 4152, Iowa City, Iowa 52244.

Stafford Loans

A Stafford Loan (formerly known as a Guaranteed Student Loan) is a low-interest loan made by a lender such as a bank, credit union, or savings and loan association. This is not a grant; you must repay this money. To be eligible, you must be enrolled at least half-time (six to eight QHs) in a degree or certificate program. You are required to file a Financial Aid Form (FAF) and a Part-Time Financial Aid Application. Applications are available in the Office of Financial Aid, 254 Richards Hall, 617-437-3190.

Massachusetts Adult Learners Grant

This program provides assistance to Aid for Families with Dependent Children (AFDC) recipients. To be eligible, you must have been a permanent legal resident of Massachusetts for at least one year prior to receiving the award, and you must be enrolled as an undergraduate student taking at least three quarter hours. You must file a Financial Aid Form (FAF). Applications are available in the Office of Financial Aid, 254 Richards Hall, 617-437-3190.

Massachusetts Part-Time Grant

To be eligible for a Part-Time Grant, you must have been a permanent legal resident of Massachusetts for at least one year prior to the opening of the academic year as well as a United States citizen or eligible noncitizen. You must be enrolled for at least three but fewer than twelve undergraduate quarter hours. In addition, you must be enrolled in a degree or certificate program. If you are not so enrolled or if you have a prior bachelor's degree, your eligibility is restricted to a total of fifteen quarter hours.

You must file a Part-Time Undergraduate Application with the Office of Financial Aid and a Financial Aid Form (FAF) with the College Scholarship Service. Applications are available in the Office of Financial Aid, 254 Richards Hall, 617-437-3190.

State Grants

If you are a Massachusetts resident taking at least twelve quarter hours for three of the four academic quarters, you should apply for a Massachusetts State Scholarship. The application is the Massachusetts Financial Aid Form. Applications are available in the Office of Financial Aid, 254 Richards Hall, 617-437-3190.

Community Sources

Students and their families are urged to explore community, industrial, and foundation sources for collegiate financial aid. Parents' employers or the appropriate union organization may be a source. In addition, local, civic, political, religious, or educational leaders are often aware of

aid sources in the immediate community. Some typical sources include PTA, Kiwanis, Lions, Elks, Knights of Columbus, Masons, Sons of Italy, Rotary, State Rehabilitation, or the American Legion.

Veterans' Benefits

Veterans covered by the Veterans Readjustment Act of 1966, Public Law 89-358, should report to 126 Hayden Hall to fill out the proper enrollment forms. Benefits depend on course load and increase sharply when a student takes more than eight quarter hours per quarter.

Students needing additional information as to eligibility, allowances, or other details are urged to contact the local office of the Veterans Administration or the Veterans' Benefits Representative at 126 Hayden Hall, 617-437-2283.

Scholarships and Application Procedures

The School of Engineering Technology and University College scholarships and awards that follow are available to students who have been accepted as degree candidates and are in good academic standing.

Scholarships are awarded once a year by the Scholarship Committee. Final selection of scholarship recipients is usually made in late May, followed by the awarding of the scholarships in late June or early July. Funds are usually applied to tuition expenses for the following academic year. Awards range in amount from \$250 to \$700.

In January, a mailing list of students who have requested applications is prepared, and applications are mailed out with the stipulation that they be completed and returned to the Scholarship Committee's director's office by March 31. To be placed on the January mailing list, call 617-437-2400 and leave your name, address, and student ID number.

Leslie B. Cutler Aviation Scholarship Awards

Established by the members of the Aero Club of New England in recognition of the late Senator Cutler's service and devotion to the interests of aviation, these awards are made to students who most typify the same interest, devotion, and leadership demonstrated by Senator Cutler during her long and distinguished public career.

Henry J. Doherty Memorial Scholarship Fund

Established in 1987 through the generosity of Doris R. Doherty as a tribute to her late husband, a 1953 graduate of the School of Business' evening program and a successful business leader in legal publishing. The income from the scholarship is awarded annually to deserving students with demonstrated financial need who are pursuing part-time evening study and have been accepted as degree candidates.

Kappa Tau Phi Scholarships

Granted annually to those women students in the arts and sciences, business, and engineering programs who rank highest at the end of the upper-middle year. If the chosen student is eligible for an award of greater monetary value, the award will be made to the next highest-ranking woman student. To be eligible for this scholarship, the student must be enrolled in a program of at least two evenings per week and must be a candidate for the bachelor's degree. In determining the recipient, grades of all courses completed in prior years shall be considered.

Robert G. Keene Memorial Scholarship Fund

Established in 1979 in memory of Robert G. Keene, a graduate of Lincoln College, now the School of Engineering Technology, Class of 1972, the endowment funds were provided by the friends and associates of Robert G. Keene and the Polaroid Corporation, where he served as an engineering manager. The income from the fund is awarded annually to an undergraduate in any college of the University who demonstrates financial need as well as strong character and initiative. Primary consideration will be given to children of Polaroid employees.

Martin Luther King, Jr., Scholarships

Established in 1969 in memory of the late Rev. Martin Luther King, Jr., awards are made, as openings occur, to minority-group adults who would otherwise be unable to continue their education. Stipends will cover tuition expenses not to exceed six quarter hours in any academic quarter (excluding the summer quarter).

William J. McGovern Memorial Scholarship

Established in 1978 by an anonymous donor who wishes to assist others in realizing their potential through higher education and to honor the memory of William J. McGovern. The income from this scholarship will benefit worthy undergraduate students actively pursuing studies in the School

of Engineering Technology or University College. Recipients must be matriculated, demonstrate financial need and academic achievement, and exhibit a high level of professional promise.

Sigma Epsilon Rho Honor Society Scholarship Award

Established in 1974 by the membership of the society, income from the fund is awarded annually to undergraduate student(s) of the School of Engineering Technology and/or University College at Northeastern University. Eligible students must have a cumulative quality-point average of 3.00 or better after completing 75 percent or more of the required studies.

H. Patricia Taylor Scholarship Fund

Established in 1974 by H. Patricia Taylor, a graduate of University College, and her husband, Harry C. Taylor, a graduate of the School of Business, the scholarship expresses their appreciation for financial assistance made available to Mrs. Taylor while obtaining her degree, and is an attempt to provide similar funds to assist others in realizing potential through higher education. The income from the scholarship fund will be awarded annually to a student enrolled in University College or the School of Engineering Technology who demonstrates financial need and academic stability and who meets certain other conditions of eligibility.

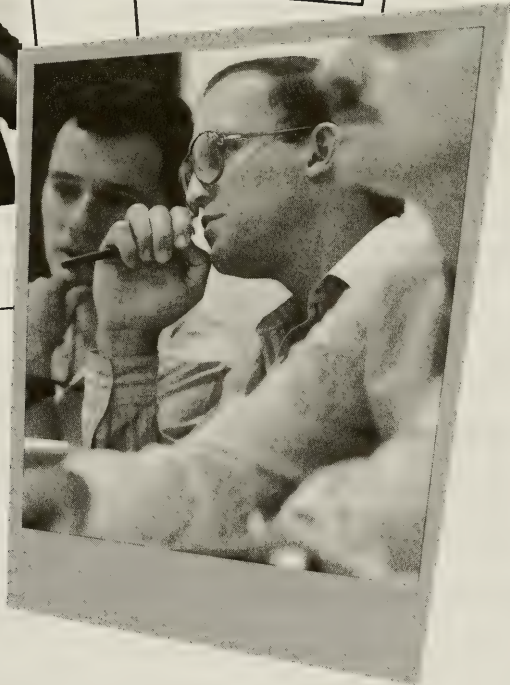
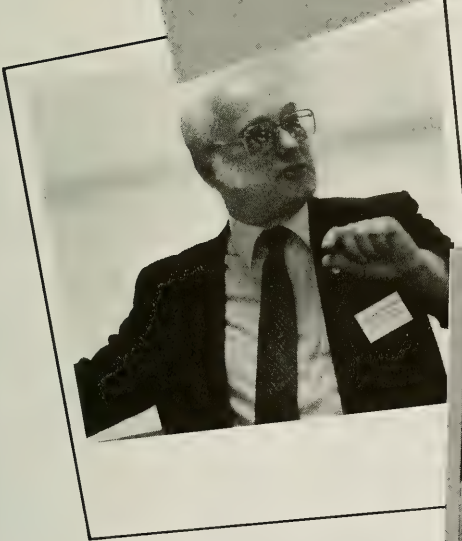
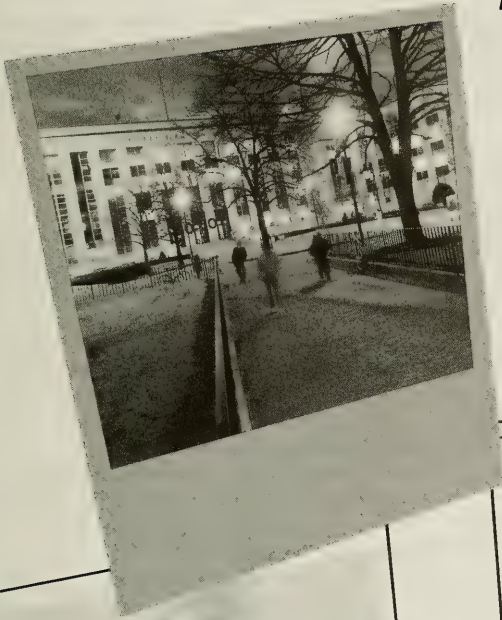
University College and the School of Engineering Technology Faculty Society Memorial Scholarship Awards

The Faculty Society of University College and the School of Engineering Technology offer two awards annually, primarily for excellence in studies, to bachelor's degree candidates in University College and the School of Engineering Technology who have carried and are currently carrying a minimum of twenty-four quarter hours annually. Applications, available during the winter quarter must be returned before the spring quarter. These awards are given in commemoration of the Faculty Society's deceased members.

Mark Caldwell Whitney Memorial Aviation Scholarship Fund

Established in 1981 by the family and friends of the late Mark Caldwell Whitney, an outstanding 1973 graduate of the Aeronautical Technology Program. Income from the fund is awarded annually to a student with financial need who exemplifies Mr. Whitney's love of flying and commitment to excellence in the aviation field.

Appendix



Faculty

A listing of the School of Engineering Technology's faculty follows.

David J. Allen, MSCE

Assistant Professor
Computer Technology

Robert B. Angus, Jr., MS

Assistant Professor
Electrical Engineering Technology

David S. Goldman, MS

Associate Professor
Computer Technology

John E. Hajjar, PhD

Assistant Professor
Computer Technology

Eric W. Hansberry, MS

Assistant Professor
Design Graphics

George F. Kent, MS, MBA, PE (MA, CT)

Visiting Associate Professor
Mechanical Engineering Technology

Nonna K. Lehmkuhl, MEd, MS

Program Coordinator and Assistant Professor
Computer Technology

Ernest E. Mills, MS, PE

Associate Professor
Mechanical Engineering Technology

Frederick J. Nohmer, EdD

Assistant Professor
Electrical Engineering Technology

Thomas E. Phalen, MS, PE

Professor
Mechanical Engineering Technology

Ronald E. Scott, ScD

Professor
Electrical Engineering Technology

A listing of the School of Engineering Technology's part-time faculty follows. Each entry gives the faculty member's name; highest degree earned; professional affiliation; and University title, department, and year of appointment.

Arnold Aaron, PhD

Engineering, Naval Underwater Systems Center
Senior Lecturer, Electrical Engineering Technology (1974)

Velda Adams, MS

Principal Engineer, Digital Equipment Corp.
Lecturer, Computer Technology (1980)

Arnold W. Almquist, MEd

Mathematics Instructor, Needham High School
Senior Lecturer, Mathematics (1967)

Francis M. Antczak, BSEE

Senior Engineer, Mass. Electric Co.
Lecturer, Electrical Engineering Technology (1985)

Philip H. Anthes, MBA

Retired
Associate Lecturer, Computer Technology (1985)

John C. Balsavich, AS

Laboratory Supervisor, Electrical Engineering, Northeastern University
Senior Lecturer, Electrical Engineering Technology (1957)

Henry G. Barry, MEd

Retired
Lecturer, Mathematics (1979)

Matteo P. Berardi, MS, PE

Technical Specialist, Impell Corporation
Senior Lecturer, Mechanical Engineering Technology (1960)

Maureen P. Berggren, BS

Mathematics Teacher, Quincy High School
Senior Lecturer, Mathematics (1965)

Wayne M. Bethoney, BS

Mechanical Engineer, AMMRC
Lecturer, Mechanical Engineering Technology (1982)

Robert E. Bobeck, MEd

Professor, Bristol Community College
Senior Lecturer, Engineering Graphics (1976)

Edward Bobroff, BSME

Test and Start-up Manager, Cogeneration
 Management/Harvard University
*Senior Lecturer and Program Consultant,
 Mathematics (1946)*

Azzouz Boulenouar, MSEE

Lecturer in Mathematics, Northeastern University
Associate Lecturer, Computer Technology (1987)

Richard P. Brennan, BSEE, BSCS

Consultant
Associate Lecturer, Computer Technology (1986)

Donald C. Brock, MS

Mathematics Instructor, Needham High School
Senior Lecturer, Mathematics (1965)

Kip A. Brown, BS

Programmer/Analyst, United States Department
 of Transportation
Lecturer, Computer Technology (1982)

Thomas J. Bugos, PhD

Software Engineer, Prime Computer
Lecturer, Computer Technology (1985)

Maria F. Burgess, MSIS

Administrative Assistant, Tel America
 Electronics, Inc.
Associate Lecturer, Computer Technology (1988)

Vincent K. Butler, MS

Assistant Manager, New England Telephone
Lecturer, Computer Technology (1982)

Joseph M. Cardito, PhD, PE, CHP (American Board of Health Physics)

Supervisor, Nuclear Fuels and Data Systems,
 Stone & Webster Engineering Corp.
*Lecturer, Mechanical Engineering
 Technology (1978)*

Robert W. Case, PhD

Coordinator for Day Program, School of
 Engineering Technology
Senior Lecturer, Mathematics (1976)

Walter J. Casey, MEd, MAT

Mathematics Teacher, Brighton High School
Senior Lecturer, Mathematics (1955)

Joan M. Chrusciel, MEd, MA

Mathematics Department Head, Quincy High School
Lecturer, Mathematics (1980)

Vincent L. Cocco, BS

Senior Engineer, Polaroid Corp.
Lecturer, Engineering Graphics (1978)

Wendell R. Collymore

Electronic Engineering Design CAD/CAM,
 Polaroid Corp.
Senior Lecturer, Engineering Graphics (1976)

Richard J. Colvario, MEd

Senior Analyst/Data Administrator, Massachusetts
 Department of Revenue
Associate Lecturer, Computer Technology (1987)

Thomas R. Connolly, BET

Controls and Instruments Engineer,
 General Electric Co.
Lecturer, Electrical Engineering Technology (1985)

Roger T. Connor, MEd

Mathematics Teacher, Milton Academy
*Senior Lecturer and Course Consultant,
 Calculus (1953)*

Robert J. Cormier, BS

Site Planner and Land Architect, Self-employed
*Lecturer, Architectural Engineering Technology
 (1984)*

James B. Corscadden, MEd, AMT

Principal, Ellis Mendell School
Senior Lecturer, Mathematics (1967)

William L. Crenshaw, MSME, PE

Research Mechanical Engineer, Army Materials and
 Mechanics Research Center
*Lecturer, Mechanical Engineering
 Technology (1978)*

David C. Crockett, MS

Senior Engineer, Raytheon Co.
*Senior Lecturer, Mechanical Engineering
 Technology (1969)*

Gregory Czarnowski, MEd

Consultant, Marketing and Advertising
*Lecturer and Course Consultant, Technical
 Communications (1982)*

Thomas R. Deveney, MA

Principal, Thomas J. Kenny School
Senior Lecturer, Mathematics (1965)

Jane E. DeVoe, MA

Lecturer in Mathematics, Northeastern University
Lecturer, Mathematics (1980)

Douglas H. Diamond, BSEE

Program Manager, Analytical Systems
 Engineering Corp.
Senior Lecturer, Mathematics (1968)

Raffaele Di Cecca, MA, MS

Assistant Professor, Wentworth Institute
 of Technology
Lecturer, Mathematics (1982)

Giles C. Dilg, MSEE, PE

President, Giles Dilg Co.

*Senior Lecturer, Computer Technology (1966)***Mark Domaszewicz, MSEE**

Senior Engineer, Raytheon Co.

*Senior Lecturer, Mathematics (1970)***Leonard F. Dow, MS, PE**

Staff Engineer, Boston Edison Co.

*Senior Lecturer, Electrical Engineering Technology and Course Consultant, Circuit Analysis (1970)***David P. Durant, MEd, MS**

Teacher, Boston Latin School

*Lecturer, Mathematics (1983)***Henry B. Eden, BA**

Vice-President, Tech-Graphics

*Senior Lecturer, Engineering Graphics (1957)***Peter A. Eggleston, MS**

Senior AI Systems Engineer, Textron Defense Systems

*Associate Lecturer, Computer Technology (1987)***Walter E. Engstrom, MS**

Physics Instructor, Braintree High School

*Lecturer, Physics (1985)***Adolf J. Erikson, MBA, PE (Mass.)**

President, A.E. Engineering Corp.

*Senior Lecturer, Engineering Graphics (1966)***Gordon C. Estabrooks, MA, MEd**

Science Teacher, Boston Latin School

*Lecturer, Physics (1983)***Andreas L. Evriviades, MA**

Teacher of Mathematics, Milton Academy

*Lecturer, Mathematics (1983)***Thomas C. Fantasia, MSEE**

Power Coordinator, Boston Edison Co.

*Lecturer, Electrical Engineering Technology (1981)***Edwin H. Farr, PhD**

Mathematician, RJO Systems Engineering

*Associate Lecturer, Mathematics (1980)***William D. Finan, DEd**

Retired

*Senior Lecturer and Course Consultant, Mathematics (1946)***John M. Flaherty, BS, PhD**

Consultant

*Lecturer, Electrical Engineering Technology (1976)***James J. Flannery, MS**

Manager, Computer Applications, Boston Edison Company

*Associate Lecturer, Electrical Engineering Technology (1980)***Donald W. Fogg, MSEE**

Senior Engineering Scientist, General Electric Company

*Associate Lecturer, Electrical Engineering Technology (1989)***Constantine Fountzoulas, PhD**

Research Associate, Center for Electromagnetic Research, Northeastern University

*Lecturer, Mechanical Engineering Technology (1985)***John J. Fraizer, BS**

Retired

*Lecturer, Physics (1981)***Thomas G. Fratto, AM**

Mathematics Teacher, Cambridge Rindge and Latin School

*Associate Lecturer, Computer Technology (1987)***Kenneth W. Gagnon, BS**

Laboratory Supervisor, Massachusetts Department of Public Safety

*Senior Lecturer, Physics (1977)***Hassan N. Gharavy, MSEE**

Assistant Professor, Mass Bay Community College

*Associate Lecturer, Computer Technology (1986)***Bernard F. Goldstein, PhD**

Manager/Controls, Dynamics Research Corp.

*Senior Lecturer, Electrical Engineering Technology (1974)***Boris Gommerstadt, PhD**

Associate Professor, Northeastern University

*Lecturer, Mechanical Engineering Technology (1984)***Philip R. Haberstroh, MSED**

Registrar, Boston Latin School

*Lecturer, Mathematics (1981)***W. Dale Hall, SB, PhD**

Member, Technical Staff, MITRE Corp.

*Lecturer, Mathematics (1981)***Gerald D. Halstead, MSEE**

Technical Staff, GTE Government Systems

*Lecturer, Electrical Engineering Technology (1985)***Francis A. Hankard, MS,**

Retired

*Senior Lecturer and Program Consultant, Physics (1946)***Lewis H. Holzman, MSCE, RLS**

Consultant, Computer Department, Stone & Webster Engineering Corp.

Senior Lecturer, Computer Technology (1966)

Daniel H. Hornbarger, MS

Director, Government Programming Systems
Division, Blue Cross
Associate Lecturer, Computer Technology (1986)

Ronald L. Jackson, MS

Senior Engineer, Missile Systems Division,
Raytheon Co.
*Associate Lecturer, Electrical Engineering
Technology (1987)*

Charles E. Jacob, MSED, MLS

Teacher, Clarence Edwards School
Senior Lecturer, Physics (1967)

John Joseph Joyce, MSED, MA

Mathematics Teacher, Winchester High School
Lecturer, Mathematics (1983)

John Kaczorowski, MSEE

Assistant Director, Northeastern University
*Senior Lecturer and Program Coordinator, Electrical
Engineering Technology (1970)*

Stephen M. Kane, EdD

Associate Professor, Co-op Education,
Northeastern University
Associate Lecturer, Mathematics (1987)

Amin Karimpour, MSEE

Assistant Professor, Franklin Institute of Boston
Associate Lecturer, Computer Technology (1989)

William F. Kasting, MSEE

Systems Engineer, Raytheon Missile Systems
Lecturer, Electrical Engineering Technology (1984)

John G. Kelly, BS

Associate, The Wyatt Co.
Lecturer, Computer Technology (1983)

George F. Kent, MS, MBA, PE (MA, CT)

Visiting Associate Professor, Mechanical
Engineering Technology
*Senior Lecturer and Course Consultant,
Materials (1962)*

David E. Kentley

President/Treasurer, D-Five Associates Inc.
Lecturer, Electrical Engineering Technology (1985)

John J. Klein, MSEE

Retired
*Senior Lecturer, Electrical Engineering
Technology (1949)*

Peter L. Kobs, MS

Writing Consultant, Digital Equipment Corp.
*Associate Lecturer, Technical
Communications (1987)*

Joseph C. LaCroix, CAGS

Chair, Mathematics Department, Boston
Latin School
Senior Lecturer, Mathematics (1974)

James E. Lennox, MS

Senior Engineer, Textron Defense Systems
Associate Lecturer, Computer Technology (1988)

Alvin J. Lesieur, MEd

Training Director, Instron Corp.
Senior Lecturer, Engineering Graphics (1965)

Demetre P. Ligor, MSEE, PE

President, Applied Measurements, Inc.
*Senior Lecturer and Associate Program Consultant,
Physics (1959)*

John F. Limongelli, BSEE

Consultant
*Associate Lecturer, Electrical Engineering
Technology (1988)*

Warren J. Little, MS

Technical Staff, Charles Stark Draper Labs., Inc.
Senior Lecturer, Physics (1966)

Guido W. Lopez, MS

Lecturer, Northeastern University
*Associate Lecturer, Mechanical Engineering
Technology (1988)*

John F. Lutkevich, BBA

Engineer-in-Charge, GTE Sylvania
Senior Lecturer, Engineering Graphics (1956)

Eliot A. Madow, BET

Projects Director, Retrieval Technologies
Associate Lecturer, Computer Technology (1985)

James T. McGrath, MA, MS, MS, MS

Teaching Assistant, Northeastern University
*Associate Lecturer and Course Consultant,
Mechanical Engineering Technology
Laboratories (1986)*

Carl J. Mellea, MS, PE (MA, RI, ME, VT, NH)

Project Engineer, Howard, Needles, Tammen
& Bergendorff
*Senior Lecturer, Civil Engineering
Technology (1960)*

Louis A. Moore, BSCE, RLS

Chief Engineer, Commonwealth of Mass., Land
Court, Boston
*Senior Lecturer, Civil Engineering
Technology (1972)*

Wassim G. Najm, MSEE

Teaching Assistant, Northeastern University
*Associate Lecturer, Electrical Engineering
Technology (1985)*

Robert B. Nilsen, MS

Engineering Manager, Polaroid Corporation
Associate Lecturer, Manufacturing Engineering Technology (1989)

Yesugey Oktay, MS, PE (MA, NY, CA, ME)

Division Head, Mechanical & Structural
 Engineering, Boston Edison Co.
Senior Lecturer, Civil Engineering Technology (1970)

Masoud Olia, MS

Lecturer, Northeastern University
Associate Lecturer, Mechanical Engineering Technology (1986)

Douglas J. Ordway, MEd

Computer Coordinator, Boston Latin School
Senior Lecturer, Computer Technology (1975)

Francis A. Pepicelli, BS

Engineer, Northrop Corp.
Senior Lecturer, Mechanical Engineering Technology (1976)

Walter J. Phinney, MBA

Engineering Manager, Raytheon Missile Division
Lecturer, Engineering Graphics (1977)

Dominic A. Piccione, MS, PE (MA, VA)

Senior Engineer, Stone & Webster Engineering Corp.
Senior Lecturer, Mechanical Engineering Technology (1966)

Richard H. Pike, MBA

Lecturer, Northeastern University
Senior Lecturer, Industrial Engineering (1980)

Norman C. Poirier, MS, PE

Research Associate, Northeastern University
Senior Lecturer, Telecommunications (1966)

Dennis D. Poulin, MS

Senior Engineer, Hewlett Packard
Associate Lecturer, Electrical Engineering Technology (1989)

Donald J. Poulin, BSIT, PE

Retired
Senior Lecturer, Electrical Engineering Technology (1970)

Daniel W. Pratt, MS

Mathematics Department, Boston Latin School
Senior Lecturer and Course Consultant, Mathematics (1967)

Charles H. Price, Jr., MSEE

Technical Staff, MITRE Corp.
Senior Lecturer and Course Consultant, Electrical Engineering Technology (1960)

Robert Rancourt, MSEE

Electrical Engineer, MITRE Corp.
Lecturer, Mathematics (1984)

James F. Regan, MSCE, PE (MA, ME, NH, VT, CT, RI, NY, NJ, PA, FL, VA, DC)

President, J. F. Regan Engineers, Inc.
Senior Lecturer, Civil Engineering Technology (1972)

Edward P. Ricupero, MEd

Head of Mathematics Department, Everett
 High School
Lecturer, Mathematics (1983)

Robert J. Ritchie, BS

Computer Graphics Supervisor, Boston Edison Co.
Lecturer, Engineering Graphics (1980)

Robert A. Rosenberg, ScD

Engineering Consultant, Stone & Webster
 Engineering Corp.
Senior Lecturer, Mechanical Engineering Technology (1983)

Eric A. Roy, MEd, MA

Senior Teacher, Don Bosco Technical High School
Senior Lecturer, Mathematics (1967)

Thomas E. Ruden, MS

Principal Engineer, Raytheon Co. Labs
Senior Lecturer, Physics (1967)

Annino D. Salvucci, AS

Staff Engineer, Honeywell Inc.
Lecturer, Engineering Graphics (1983)

Leo D. Salvucci, MEd, MST

Mathematics Teacher, Boston Latin School
Senior Lecturer, Mathematics (1965)

Stephen Schwarm, BSEE

Senior Technical Consultant, Prime Computer Inc.
Associate Lecturer, Computer Technology (1985)

John W. Shaw, AS

Field Service Engineer, Northeast Electronics, Inc.
Lecturer, Electrical Engineering Technology (1985)

Howard T. Shippen, MSEE

Consultant, Shippen Associates
Associate Lecturer and Program Coordinator for Telecommunications (1987)

M. Daniel Simkovitz, MS

Manager, Communication Services, Academic
 Computer Resource Center, Northeastern
 University
Associate Lecturer, Computer Technology (1986)

Ronald J. Skilton, BS

Manager/Systems, Stone & Webster
Engineering Corp.
Lecturer, Computer Technology (1983)

Joseph E. Steffano, Sr., MS, MBA, PE (MA, VT, NH, CT, ME, RI, NY, PA) RLS (MA, CT, NH, ME, RI, VT)

Chief Engineer, Stone & Webster Engineering Corp.,
Structural Division
Senior Lecturer, Civil Engineering Technology (1965)

Harold J. Stengel, SB

Secondary Teacher in Mathematics, Boston
Latin School
Lecturer, Mathematics (1982)

M. Carlton Storms, MEd

Teacher, Braintree High School
Senior Lecturer, Physics (1967)

Nabil S. Sukkar, MSCE

Director of QA, American Science and
Engineering
Lecturer, Civil Engineering Technology (1984)

Raimundas Sukys, MS

Senior Research Associate in Electrical
Engineering, Northeastern University
Senior Lecturer, and Course Consultant, Electrical Engineering Technology (1962)

Donald M. Sullivan, MEd

Mathematics Teacher, Dedham High School
Lecturer, Mathematics (1984)

David G. Sveden, MEd

Mathematics Instructor, Town of Needham
Lecturer, Mathematics (1979)

Jerome Tapper, BSEE

President, Electro-Mechanical Solution Consultants
Lecturer, Electrical Engineering Technology (1982)

David K. Toebes, MSEE

Design Engineer, Raytheon Co.
Associate Lecturer, Mathematics (1987)

Richard W. Torian, MSED

Chair, Mathematics Department, Ashland
High School
Senior Lecturer, Mathematics (1965)

John S. Travia, MSEE, PE

Retired
Senior Lecturer, Electrical Engineering Technology (1965)

Edward P. Tribuna, BET, FAA, A&P Certificate

Software Services Consultant, Digital
Equipment Corp.
Lecturer, Electrical Engineering Technology (1985)

Daniel P. Truesdell, BS

Consultant, G.E. Consulting Services Corp.
Associate Lecturer, Computer Technology (1988)

Mohanan K. R. Unni, MS

Systems Engineer, Optronics Inc.
Lecturer, Electrical Engineering Technology (1985)

John F. Videler, MS

Manager, Instrument Standards and Controls,
General Electric Co.
Senior Lecturer, Electrical Engineering Technology (1968)

Marianne Walpert, MS

Software Designer, New England Electric Services
Associate Lecturer, Physics (1985)

Joel R. Weinstein, BSEE

President, High Technology Marketing
Senior Lecturer, Computer Technology (1977)

James T. Welch, MS

Principal Engineer, Ungermann-Bass, Inc.
Senior Lecturer and Course Consultant, Computer Technology (1977)

Albert G. Wilson, MS, PE, SE (IL)

Retired
Senior Lecturer and Course Consultant, Mechanical Engineering Technology (1948)

Susan L. Wood, BSEE

Software Engineer, Ungermann-Bass, Inc.
Lecturer, Computer Technology (1984)

Walter Zagieboylo, MS, ME, PE, MAA

Town Appraiser and Assessor, Wrentham, Mass.
Senior Lecturer, Mathematics (1969)

Mansour Zenouzi, MS

Lecturer, Northeastern University
Lecturer, Mechanical Engineering Technology (1982)

Administration

Administrative Officers

Thomas E. Hulbert, MS, PE, *Director*
 Roy A. Dalsheim, BS, *Assistant Director*
 Rasma Galins, *Assistant Director*
 John Kaczorowski, Jr., MS, *Assistant Director*
 Rosanne L. Bogan, BS, *Staff Assistant*

Student Counseling Staff

David J. Allen, MSCE
 Boreslaw P. Berestecky, MEd
 Rosanne L. Bogan, BS
 Roy A. Dalsheim, BS
 Rasma Galins, *Administrative Coordinator*
 David S. Goldman, MS
 John Kaczorowski, Jr., MS
 Stephen M. Kane, EdD
 Nonna K. Lehmkuhl, MEd, MS
 Ernest E. Mills, MS, PE
 Thomas E. Phalen, MS

Committee on Regulation and Discipline

Thomas E. Hulbert, MS, PE, *Chair*
 Roy A. Dalsheim, BS
 Rasma Galins
 John Kaczorowski, Jr., MS

Academic Standing Committee

Thomas E. Hulbert, MS, PE, *Chair*
 David J. Allen, MSCE
 Rosanne L. Bogan, BS, *Secretary*
 Roy A. Dalsheim, BS
 Rasma Galins
 John Kaczorowski, Jr., MS
 Stephen M. Kane, EdD
 Nonna K. Lehmkuhl, MEd, MS
 Ernest E. Mills, MS, PE

Academic Advisory Council

Thomas E. Hulbert, MS, PE, *Chair*
 Edward Bobroff, BME
 Roy A. Dalsheim, BS
 Rasma Galins
 Francis R. Hankard, MA
 John Kaczorowski, Jr., MS
 Nonna K. Lehmkuhl, MEd, MS

Industrial Advisory Committee

Frank Archambault, *Vice President, Norlite Corporation*
 Matteo Berardi, *Technical Specialist, Impell Corporation*

Paul Farris, *Manager, Critical Account Management Center, Bull Worldwide Information Systems*

Robert Hayden, *Executive Director, MassPep, Inc.*

Daniel Hornbarger, *Director, Government Programs Systems, Blue Cross of Massachusetts*

Robert Horowitz, *President and Chair, Hancock Machine Company*

Barbara Kane, *Director, Department of Computer Education, Natick Public Schools*

Peter Lillios, *President, International Totalizing Systems*

Melvin Mark, *Consultant*

Roger Miller, *Software Engineer, General Dynamics, Electric Boat Division*

Susan Moulton, *Executive Director, Bay State Skills Corporation*

Charles Price, *Technical Staff, Mitre Corporation*

Jeffrey Ross, *Staff Manager, EDS Center, New England Telephone Company*

Curriculum Advisory Committee

Thomas E. Hulbert, MS, PE (Academic Administration), *Chair*

Rasma Galins, *Secretary*

David J. Allen, MSCE (Program Consultant, Civil Engineering Technology Associate Degree, Evening Programs)

Edward Bobroff, BME (Program Consultant, Mathematics)

Rosanne L. Bogan, BS

Robert W. Case, PhD (Coordinator, Day Mathematics)

Roger T. Connor, MEd (Course Consultant, Calculus)

Gregory Czarnowski, MEd (Technical Communications)

Roy A. Dalsheim, BS

Leonard F. Dow, MS, PE (Circuit Analysis)

William D. Finan, DEd (Introductory Mathematics)

David S. Goldman, MS (Program Consultant, Manufacturing Engineering Technology, Evening Program)

Francis R. Hankard, MA (Program Consultant, Physics)

Eric W. Hansberry, MS (Engineering Graphics, Electrical Engineering Graphics, and Design Graphics)

John Kaczorowski, Jr., MS (Program Consultant, Electrical Engineering Technology, Evening Program and Electronic Labs)

Nonna K. Lehmkuhl, MEd, MS (Program Consultant, Computer Technology, Day and Evening Programs)

Demetre P. Ligor, MS, PE (Associate Program Consultant, Physics)

James T. McGrath, MA, MS, MS, MS (Mechanical Technology Laboratories)

Ernest E. Mills, MS, PE (Stress Analysis and Advanced Stress Analysis)

Daniel W. Pratt, MS (First-Year Mathematics)

Charles H. Price, MSEE (Digital and Hybrid Computers, Digital Systems)

Howard T. Shippen, MS (Telecommunications)

Raimundas Sukys, MS (Pulse Circuits, Electronics, and Principles of Communication Systems)

James Welch, MS (Computer Technology Hardware Courses)

Albert G. Wilson, MS, PE (Statics and Dynamics)

Governing Boards and Officers of the University

Members of the Corporation

Class of 1990

*William F. Allen, Jr.
 Kenneth W. Ballou
 Alan D. Bell
 §Frederick Brodsky
 *Frederick L. Brown
 *Helene R. Cahners-Kaplan
 Walter J. Connolly, Jr.
 *Gary L. Countryman
 William S. Edgerly
 Richard J. Egan
 §William Elfers
 ‡Bryon K. Elliott
 ‡Frank L. Farwell
 §Joseph D. Feaster, Jr.
 §Phil David Fine
 *Neal F. Finnegan
 §Albert S. Frager
 §Brenda J. Furlong
 Murray J. Gart
 Paul W. Glennon
 ‡Lloyd S. Glidden, Jr.
 Rosalind E. Gorin
 John L. Grandin
 ‡Donald B. Guy
 ‡Allan M. Hale
 Edmund Blair Hawley
 Michael E. Haynes
 *James S. Hekimian
 William Hellman
 James S. Herbert
 §Colby Hewitt, Jr.
 Richard D. Hill
 Robert W. Holmes
 Hartwell G. Howe
 John S. Howe
 Richard P. Johnson
 ‡Henry C. Jones
 Richard Kazmaier
 Walter B. Kelley
 ‡Frances C. Kenerson
 Edward M. Kennedy
 Fenton G. Keyes
 Calvin A. King
 ‡Asa S. Knowles

*Member of the Board of Trustees
 ‡Honorary Trustee
 ‡Lifetime Trustee, Emeritus
 §Member of the Board of Overseers

Donald J. Kramer
 Evelyn M. Lane
 Maurice Lazarus
 John R. Leeman
 Allyn Levy
 Elma Lewis
 Chan K. Lin
 George M. Lovejoy, Jr.
 K. Prescott Low
 §Peter E. Madden
 Maurice Mann
 §Jasper W. Morgan, Jr.
 *Kathryn M. Nicholson
 *George A. Snell
 *Stephen J. Sweeney
 ‡D. Thomas Trigg
 *Martin F. Walsh

Class of 1991

*Vincent Barletta
 Michael A. Brown
 *Louis W. Cabot
 §Philip M. Chrusz
 James E. Cofield, Jr.
 William E. Cook
 *John J. Cullinane
 §Arnold I. Friedman
 Charles K. Gifford
 Frederic T. Hersey
 *Arnold S. Hiatt
 §John J. Hurley, Jr.
 John F. Kerry
 §C. Joseph LaBonte
 §Joseph C. Lawler III
 Bertram M. Lee
 *Kenneth A. Loftman
 *John Lowell
 *Robert C. Marini
 ‡Lawrence H. Martin
 M. Dorothy Massey
 §Walter E. Mattson
 William J. McCune, Jr.
 *Katherine S. McHugh
 Alan S. McKim
 John A. McNeice, Jr.
 Dominic Meo, Jr.
 Donald H. Moore
 James A. Morris
 E. James Morton
 Donald S. Moscone
 Lawrence C. Moulter
 N. Lawrence Nagle
 Williams H. Nichols, Jr.

Stanley C. Olsen
 James H. Orr
 *Edward O. Owens
 Ara Oztemel
 Sophia H. Pappas
 Edward S. Parsons
 Lawrence T. Perera
 Nicholas V. Petrou
 Edward E. Phillips
 †Thomas L. Phillips
 Edward D. Phinney
 Rudolph F. Pierce
 Jerome M. Powell
 Albert Pratt
 John F. Prendiville
 §George Putnam
 §Francis J. Quirico
 William H. Raye, Jr.
 Kathleen M. Rice
 D. Paul Rich
 Robert Riesman
 Daniel J. Roberts
 *Charlotte B. Smith
 *An Wang
 Seymour L. Yanoff

Class of 1992

§Louis H. Barnett
 *Thomas E. Cargill, Jr.
 *Michael J. Cronin
 James S. Curvey
 §Harry T. Daniels
 §Carl E. Dantas
 †Kenneth G. Fisher
 Frieda Garcia
 Corinne P. Grande
 *Joseph E. Heney
 Edward C. Johnson 3d
 ‡Robert L. Johnson
 J. Philip Johnston
 *George S. Kariotis
 *Diane H. Lupean
 Terence P. McDermott
 *Peter F. O'Connell
 §Richard C. Ockerbloom
 Paul J. Palmer
 §Dennis J. Picard
 *William J. Pruyn
 W. Warren Ramirez
 Ralph B. Rogers
 Ronald L. Rossetti
 Ernest J. Sargeant
 Donald W. Seager
 Sydney Shaftman
 James L. Shanahan
 Dorothy M. Simon
 Paul D. Slater
 John F. Smith
 ‡Donald W. Smith
 O. Phillip Snowden
 *Bernard Solomon
 Peter V. Sorgi
 Robert C. Sprague

Milton Stern
 David B. Stone
 §Galen L. Stone
 *H. Patricia Taylor
 Lawrence I. Templeman
 Charles H. Tenney II
 Milton A. Thompson
 *W. Nicholas Thorndike
 *Alan D. Tobin
 Paul E. Tsongas
 Joseph F. Turley
 ‡Chaplin Tyler
 William Tyler
 Carole J. Urich
 §Edward L. Wax
 David T. Wendell
 Donald F. Whiston
 §John T. Williams
 *Robert H. Willis
 Richard W. Young
 ‡Alvin C. Zises

Class of 1993

Julius Abrams
 Yousef A. As'ad
 ‡Diana J. Auger
 Robert J. Awkward
 Lincoln C. Bateson
 ‡Roy H. Beaton
 George D. Behrakis
 ‡F. Gregg Bemis
 Alfred M. Bertocchi
 §Scott M. Black
 §Stuart Marshall Bloch
 S. Whitney Bradley
 Melvin B. Bradshaw
 Richard L. Bready
 §William L. Brown
 Wayne A. Budd
 John L. Burns
 Victor C. Bynoe
 Milton L. Cail
 James F. Carlin
 §Richard P. Chapman, Jr.
 Robert Clayson
 Livingstone N. Coakley
 Abram T. Collier
 Carol L. Cone
 §T. Paul Connolly
 James J. Costello
 William J. Cotter
 Edward Creiger
 H. James Crossan, Jr.
 James A. Daley
 J.H. Dow Davis
 §Melanie C. Dean
 William O. DiPietro
 Alfred di Scipio

*Member of the Board of Trustees
 †Honorary Trustee
 ‡Lifetime Trustee, Emeritus
 §Member of the Board of Overseers

Estelle Dockser
 David F. Doyle
 ‡William R. Driver, Jr.
 *Ruth S. Felton
 Mark S. Ferber
 †James V. Fetchero
 Judy George
 Joseph A. Grady
 Calvin M. Grimes, Jr.
 *Ernest Henderson III
 Edward L. Hennessy, Jr.
 D. Brainerd Holmes
 *Carl R. Hurtig
 *Harvey C. Krentzman
 Dean T. Langford
 *George J. Matthews
 Mark Roosevelt
 *Kenneth G. Ryder
 Ray Strata
 Garrett A. Sullivan
 Wilson B. Tuffin
 Randel E. Vataha
 *James L. Waters
 §Catherine A. White
 §Charles A. Zrakat

Ex Officio

John A. Curry, President

Officers of the Corporation and Board of Trustees

George J. Matthews, Chair
 Thomas E. Cargill, Jr., Vice Chair
 John Lowell, Vice Chair
 Charlotte B. Smith, Vice Chair
 Vincent J. Lembo, Secretary
 Deanna P. Jantzen, Assistant Secretary
 Joseph D. Murphy, Assistant Secretary
 Bryon K. Elliot, Lifetime Chair, Emeritus
 Robert H. Willis, Chair, Emeritus
 William R. Driver, Jr., Honorary Vice Chair
 Frank L. Farwell, Honorary Vice Chair
 D. Thomas Trigg, Honorary Vice Chair

Board of Trustees

Class of 1990

William F. Allen, Jr.
 Frederick L. Brown
 Helene R. Cahniers-Kaplan
 Gary L. Countryman
 James S. Hekimian
 Kathryn M. Nicholson
 George A. Snell

*Member of the Board of Trustees

†Honorary Trustee

‡Lifetime Trustee, Emeritus

§Member of the Board of Overseers

Stephen J. Sweeney
 Martin F. Walsh

Class of 1991

Vincent Barletta
 Louis W. Cabot
 John J. Cullinane
 Arnold S. Hiatt
 Kenneth A. Loftman
 John Lowell
 Katherine S. McHugh
 Edward O. Owens
 Charlotte B. Smith
 An Wang

Class of 1992

Thomas E. Cargill, Jr.
 Michael J. Cronin
 Joseph E. Heney
 George S. Kariotis
 Diane H. Lupean
 Peter F. O'Connell
 William J. Pruyne
 Bernard Solomon
 H. Patricia Taylor
 Alan D. Tobin
 Robert H. Willis

Class of 1993

Ruth S. Felton
 Neal F. Finnegan
 Ernest Henderson III
 Carl R. Hurtig
 Harvey C. Krentzman
 Robert C. Marini
 George J. Matthews
 Kenneth G. Ryder
 W. Nicholas Thorndike
 James L. Waters

Ex Officio

John A. Curry, President

Honorary Trustees

James V. Fetchero
 Kenneth G. Fisher
 Thomas L. Phillips

Lifetime Trustees, Emeriti

Diane J. Auger
 Roy H. Beaton
 F. Gregg Bemis
 William R. Driver, Jr.
 Bryon K. Elliott
 Frank L. Farwell
 Lloyd S. Glidden, Jr.
 Donald B. Guy
 Allan M. Hale
 Robert L. Johnson
 Henry C. Jones
 Frances C. Kenerson
 Asa S. Knowles
 Lawrence H. Martin

Donald W. Smith
D. Thomas Trigg
Chaplin Tyler
Alvin C. Zises

Board of Overseers

Class of 1990

William Elfers
Phil David Fine
Albert S. Frager
Brenda J. Furlong
Colby Hewitt, Jr.
Peter E. Madden
Jasper W. Morgan, Jr.

Class of 1991

Philip M. Chrusz
Joseph D. Feaster, Jr.
Arnold I. Friedman
John J. Hurley, Jr.
C. Joseph LaBonte
Joseph C. Lawler III
Walter E. Mattson
George Putnam

Class of 1992

Louis H. Barnett
Frederick Brodsky
Harry T. Daniels
Carl E. Dantas
Richard C. Ockerbloom
Dennis J. Picard
Galen L. Stone
Edward L. Wax
John T. Williams

Class of 1993

Scott M. Black
Stuart M. Bloch
William L. Brown
Richard P. Chapman, Jr.
T. Paul Connolly
Melanie C. Dean
Catherine A. White
Charles A. Zrakat

Ex Officio

John A. Curry, President
George J. Matthews, Chair
President, Alumni Association
Chairman, The National Council

Administrative Organization

Officers of the University

Michael A. Baer, BA, MA, PhD
Provost

Philip T. Crotty, AB, AM, MBA, MSc, EdD
Senior Vice President

John A. Curry, AB, EdM, EdD
President

Edmund L. Deltano, BA
Vice President for Finance and Acting Treasurer

James B. King, BA, LLD (hon)
Senior Vice President for Government Relations

Asa S. Knowles, AB, AM, LLD, LittD, ScD, DBA, ScD
in Bus Ed (hon)
Chancellor Emeritus

Philip LaTorre, BS, MS
Vice President for Human Resource Management

John A. Martin, BS, MBA
Vice President for Business

John D. O'Bryant, BS, MEd
Vice President for Student Affairs

Anthony N. Penna, BS, MA, DA
Senior Vice President (on leave)

Eugene M. Reppucci, Jr., BS, MEd
Senior Vice President for Development

Kenneth G. Ryder, AB, MA; LHD, LittD (hon)
Chancellor

Royal K. Toebes, BS, MBA
Vice President for Alumni Development

Karl Weiss, BS, PhD
Vice President for Academic Development
and Interim Vice President for Cooperative
Education

Academic Deans, Directors of Schools, and General Administrative Officers

Alan R. Benenfeld, BMetE, MLS, MS
Dean and Director of University Libraries

David P. Boyd, BA, PhD
Dean of the College of Business Administration

Cynthia A. Brown, BS, MA, PhD
Dean of the College of Computer Science

Irwin M. Cohen, BS, MS
Director of Men's Athletics and Assistant Dean
Administrator

Martin J. Damian, BS
Bursar

Charles Devlin, BS, MEd
Dean of Student Financial Services

William M. Fowler, Jr., BA, PhD
Vice Provost for Undergraduate Education

Clifford L. Fralen, BS, MSE, MBA
Director of Physical Plant

David R. Freeman, BMgtE, MS, PhD
Associate Dean of Engineering and Director of the
Graduate School of Engineering

William A. Frohlich, BA
Dean and Director of University Press

Ronald W. Geason, BS, MS
Associate Provost for Budget and Planning

Daniel J. Givelber, AB, LLB
Dean of the School of Law

James J. Gozzo, BS, PhD
Acting Dean of the College of Pharmacy and Allied
Health Professions

Charles L. Hallenborg, BS, MPA
Dean of Physical Planning and Operations

Daryl A. Hellman, BS, PhD
Vice Provost for Faculty Affairs and Student
Relations

Thomas E. Hulbert, BMgtE, MS
Director of the School of Engineering Technology
and Associate Dean of Engineering

Ellen S. Jackson, BA, EdM, CAGS, DH, DHL (hon)
Dean and Director of Affirmative Action

John W. Jordan, BS, MEd
Dean of University College

Paul M. Kalaghan, AB, MS, PhD
Vice Provost for Research and Graduate Education

William I. Kelly, BS, MS
Director of the Graduate School of Professional
Accounting

Paul H. King, BS, MS, PhD
Dean of the College of Engineering

Paul M. Lepley, BS, MEd, EdD
Dean of Boston-Bouvé College of Human
Development Professions

Robert P. Lowndes, BSc, MBA, PhD
Dean of the College of Arts and Sciences

Bruce W. Lowney, MD
Director of Health Services

Kathryn Luttgens, BS, MS, PhD
Associate Provost (on leave)

Ronald J. McAllister, AB, MA, PhD
Associate Dean for Academic Affairs of the College
of Arts and Sciences

Philip R. McCabe, BA, MEd
Dean of Admissions

Edmund J. Mullen, BA, MEd
University Registrar

Kay D. Onan, BA, PhD
Associate Dean for Faculty Affairs and Director of
the Graduate School of the College of Arts and
Sciences

Paul M. Pratt, BS, MEd
Dean of the Department of Cooperative Education

Karen T. Rigg, AB, MA, EdD
Dean of Students

Daniel J. Roberts, BS, MBA, EdM, LLD (hon)
Senior Financial Adviser

Norman Rosenblatt, AB, PhD
Dean of the College of Criminal Justice

Jeanne L. Rowlands, BA, BS, MA
Director of Women's Athletics

Phyllis M. Schaen, BS, MEd, EdD
Dean of Administration

Robert A. Schatz, BS, MS, PhD
Acting Director of the Graduate School of the
College of Pharmacy and Allied Health
Professions

Carole A. Shea, RN, BS, MS, PhD
Interim Director of the Graduate School of the
College of Nursing

Paul Tracy, AB, MA, PhD
Director of the Graduate School of Criminal Justice

Janice Walker, AB
Assistant Dean and Director of the Graduate
School of Boston-Bouvé College of Human
Development Professions

Mitchell Wand, SB, MS, PhD
Associate Dean and Director of Graduate Studies
of the College of Computer Science

Joseph P. Zolner, BS, MPPM
Acting Director of the Graduate School of Business
Administration

Eileen H. Zungolo, RN, BS, MEd, EdD
Dean of the College of Nursing

General University Committees

University Council, 1989–1990

John A. Curry, Chair
Robert P. Lowndes, Vice Chair
Janet M. Surette, Secretary

Alan R. Benenfeld
David P. Boyd
Philip T. Crotty
Vincent C. DeBaun
Edmund L. Deltano
William M. Fowler, Jr.
Clifford J. Fralen
Ronald W. Geason
Daniel J. Givelber
James J. Gozzo
*Deborah F. Greenwald
Charles L. Hallenborg
Daryl A. Hellman
Ellen S. Jackson
Paul D. Jones
John W. Jordan
Paul M. Kalaghan
James B. King
Paul H. King
William E. Kneeland, Jr.
Philip Latorre
Vincent J. Lembo
Paul M. Lepley
Philip R. McCabe
*Wesley W. Marple, Jr.
John A. Martin
Christopher Mosher
Edmund J. Mullen
Maureen T. Nelligan
John D. O'Bryant
Katherine N. Pendergast
Donald G. Porter
Paul M. Pratt
Eugene M. Reppucci, Jr.
Karen T. Rigg
Norman Rosenblatt
Phyllis M. Schaen
Alan L. Selman
Eileen D. Stack
Michael J. Tighe
Royal K. Toebes
Joy W. Viola
Karl Weiss
David C. Wharton
Raymond R. Williams
Roy L. Wooldridge
Eileen H. Zungolo

Faculty Senate, 1989–1990

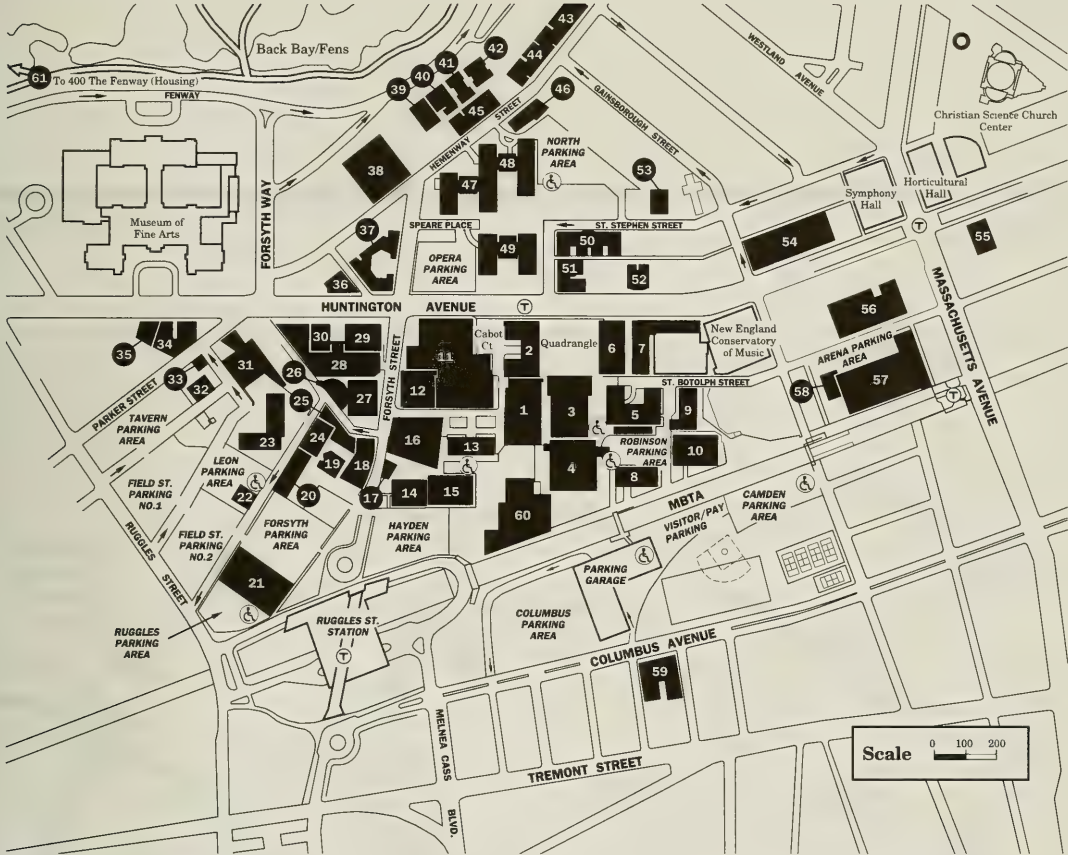
Neil Alper
Kostia Bergman
David P. Boyd
Ralph A. Buonopane
Holly M. Carter
Richard A. Daynard
Charles H. Ellis, Jr.
William L. Faissler
Edith E. Flynn
Christine W. Gailey
Daniel J. Givelber
Harold M. Goldstein
Alexander M. Gorlov
James J. Gozzo
Deborah F. Greenwald
Carolyn D. Heising
John W. Jordan
Paul H. King
Paul M. Lepley
Robert P. Lowndes
Wesley W. Marple, Jr.
S. James Matthews
Joseph W. Meador
Stephen W. McKnight
Robert W. Miller
Stephen L. Nathanson
Irene A. Nichols
Suzanne Ogden
Robert A. Parsons
Paul M. Pratt
Norman Rosenblatt
Eugene J. Saletan
Edward Saunders
Gustav Schachter
Philip E. Serafim
Raoul Smith
Michael T. Vaughn
Nancy L. Walden
Eileen H. Zungolo

Campus Maps

Access to Boston



Main Campus



Academic and Service Buildings

- 22 African-American Institute (AF)
- 12 Barletta Natatorium (BN)
- 19 Boiler Plant
- 7 316 Huntington Ave.
(Northeastern at the YMCA)
- 11 Cabot Physical Education Building (CB)
- 39 Cahners Hall (CA)
- 28 Cargill Hall (CG)
- 13 Churchill Hall (CH)
- 59 Columbus Place
(716 Columbus Avenue) (CP)
- 56 Cotting School (CT)
- 9 Cullinane Hall (CN)
- 40 Cushing Hall (CU)
- 14 Dana Research Center (DA)
- 27 Dockser Hall (DK)
- 6 Dodge Building (DB)
- 3 Ell Student Building (Auditorium) (EL)
- 4 Ell Student Center (Student Lounge) (EC)
- 16 Forsyth Building (FR)
- 17 Forsyth Building Annex (FA)
- 38 Forsyth Dental Building (FE)
- 1 Hayden Hall (HA)
- 33 Hillel-Frager (HF)
- 24 Holmes Hall (HO)
- 55 236 Huntington Avenue (HU)

Residence Buildings

- 34 Burstein Hall
- 51 337 Huntington Ave.
- 43 Kennedy Hall
- 46 142-148 Hemenway Street
- 45 153/157-163 Hemenway St.
- 36 407 Huntington Ave.
- 52 319 Huntington Ave.
- 41 Kerr Hall
- 53 Light Hall
- 42 Melvin Hall

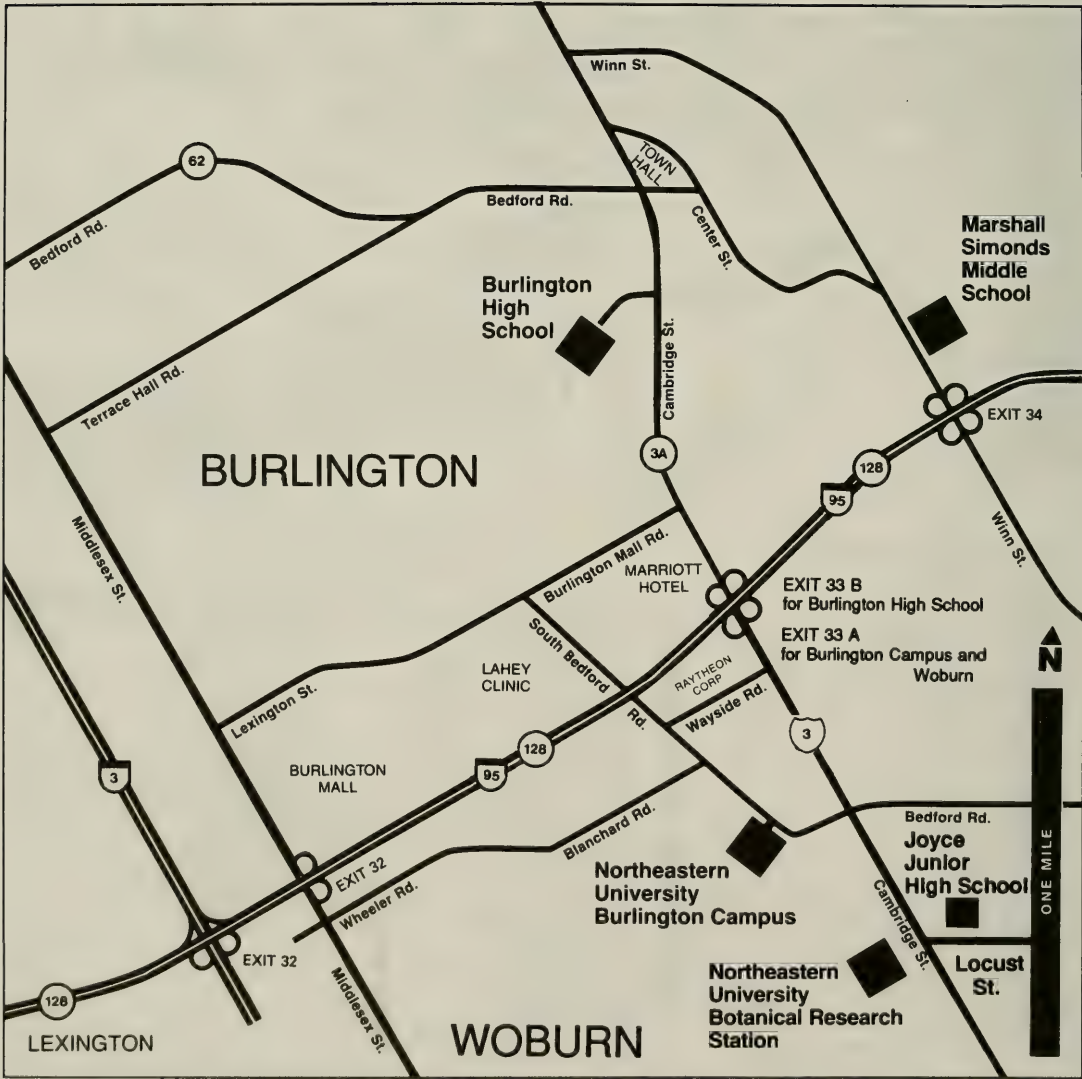
- 54 Huntington Plaza
(271 Huntington Avenue) (HN)
- 10 Hurtig Hall (HT)
- 26 Kariotis Hall (KA)
- 41 Kerr Hall (Faculty Center) (KH)
- 29 Knowles Center (Gryzmish Hall) (KG)
- 29 Knowles Center (Volpe Hall) (KV)
- 25 Lake Hall (LA)
- 60 Library (LR)
- 57 Matthews Arena (MA)
- 56 Matthews Arena Annex (MX)
- 20 Meserve Hall (ME)
- 5 Mugar Life Science Building
(Peabody Health Professions Center) (MU)
- 18 Nightingale Hall (NI)
- 31 Parker Building (PA)
- 5 Peabody Center
- 2 Richards Hall (RI)
- 8 Robinson Hall (RB)
- 21 Ryder Hall (RY)
- 15 Snell Engineering Center (SN)
- 50 122 St. Stephen Street (SS)
- 30 Stearns Center (ST)
- 32 26 Tavern Road (TA)

Key

- Academic, Residential, and Service Buildings
- Handicap Parking
- Handicap Routes
- Street Direction

Maps are provided by the Information Center 115 Richards Hall, extension 2736. Some buildings on this map are used but not owned by Northeastern University. 3/90

Burlington



Dedham



Marlboro



Mission

Northeastern University's mission, as a large urban university founded on the cooperative model of education, is to provide individuals with the opportunity for upward mobility through excellence in education. The University achieves its mission through curricula that value equally knowledge for its own sake, knowledge as a means to success in the workplace, and knowledge as a cornerstone of personal achievement and satisfaction.

Achieving Northeastern University's mission requires excellence in teaching, and teaching remains the central activity of Northeastern's faculty. By offering undergraduate and graduate programs that are rigorous, relevant, and rewarding, the University provides a solid structure for educational excellence. Northeastern University is also committed to the search for knowledge through the scholarly and artistic undertakings of its faculty and students.

A central mandate of Northeastern University is to offer students the opportunity to apply directly lessons of the classroom and laboratory to the workplace through cooperative education. For three quarters of a century, cooperative education has been the keystone of Northeastern's uniqueness.

Northeastern University is committed to serving the educational needs of a diverse student population in an amenable physical environment. The University believes that its mission can be achieved only if the student body is not limited by economic status, cultural or racial background, geographic origin, sex, or age.

Looking beyond the confines of the campus, Northeastern University is determined to maintain and strengthen its reputation as a friend to the City of Boston and a partner of the Commonwealth of Massachusetts. Through its numerous outreach programs, the University has made striking contributions to the community in the applied social sciences, in high technology, and in the arts. Northeastern University will continue to contribute in these and other ways to the region's overall quality of life and to its economic vitality.

Accreditation Statement

Northeastern University is accredited by the New England Association of Schools and Colleges, Inc., a non-governmental, nationally recognized organization whose affiliated institutions include elementary schools through collegiate institutions offering post-graduate instruction.

Antidiscrimination Policy

Northeastern University is committed to a policy of equal opportunity for all students and employees without regard to race, color, religion, sex, sexual preference, national origin, handicap, or veteran status. The University prohibits discrimination in all matters involving admission, registration, and all official relationships with students, including evaluation of academic performance.

Delivery of Services

The University assumes no liability, and hereby expressly negates the same, for failure to provide or delay in providing educational or related services or facilities or for any other failure or delay in performance arising out of or due to causes beyond the reasonable control of the University. Such causes include, without limitation, power failure, fire, strikes by University employees or others, damage by the elements, and acts of public authorities. The University will, however, exert reasonable efforts, when in its judgment it is appropriate to do so, to provide comparable or substantially equivalent services, facilities or performance, but its inability or failure to do so shall not subject it to liability.

The Northeastern University catalog contains current information regarding the University calendar, admissions, degree requirements, fees, and regulations, and such information is not intended to be and should not be relied upon as a statement of the University's contractual undertakings.

Northeastern University reserves the right in its sole judgment to promulgate and change rules and regulations and to make changes of any nature in its program, calendar, admissions policies, procedures and standards, degree requirements, fees, and academic schedule whenever it is deemed necessary or desirable, including, without limitation, changes in course content, the rescheduling of classes, cancelling of scheduled classes and other academic activities and requiring or affording alternatives for scheduled classes or other academic activities, in any such case giving such notice as is reasonably practicable under the circumstances.

Northeastern University will do its best to make available to you the finest education, the most stimulating atmosphere and the most congenial conditions it can provide. But the quality and the rate of progress of your academic career is in large measure dependent upon your own abilities, commitment, and effort. This is equally true with respect to professional advancement upon completion of the degree or program in which you are enrolled. The University cannot guarantee that you will obtain or succeed at any particular job; that will depend upon your own skills, achievement, presentation, and other factors such as market conditions at that time. Similarly, in many professions and occupations there are increasing requirements imposed by federal and state statutes and regulatory agencies for certification or entry into a particular field. These may change during the period of time when you are at Northeastern and they may vary from state to state and from county to county. While the University stands ready to help you find out about these requirements and changes, it is your responsibility to initiate the inquiry because the University has no other way of knowing what your expectations and understandings are.

In brief, the University is there to offer you educational opportunities and choices and to assist you in finding the direction in which you want to steer

your educational experience. But you are a partner in this venture with an obligation and responsibility to yourself.

Emergency Closing of the University

Northeastern University has made arrangements to notify students, faculty and staff by radio when it becomes necessary to cancel classes because of extremely inclement weather. AM radio stations WBZ (1030), WEEI (590), WHDH (850), WRKO (680), and FM stations WBCN (104.1), and WROR (98.5) are the stations authorized to announce the University's decision to close. Since instructional television courses originate from live or broadcast facilities at the University, neither the classes nor the courier service operate when the University is closed.

Equal Opportunity Employment Policy

Northeastern University is an equal opportunity employer. It is institutional policy that there shall be no discrimination against any employee or applicant for employment because of race, color, religion, sex, sexual preference, age, national origin, handicap, or veteran status.

Northeastern University also prohibits discrimination against any employee regarding upgrading, demotion or transfer, layoff or termination, rates of pay or other forms of compensation, and selection for training. In addition, Northeastern adheres to Affirmative Action guidelines in all recruitment endeavors.

Further, Northeastern will not condone any forms of sexual harassment which is defined as the use of sexual advances, requests for favors, and other verbal or physical conduct of a sexual nature, as an explicit or implicit condition of employment, as the basis for employment decisions, or to interfere with an individual's work performance by creating an intimidating, hostile, or offensive work environment.

Inquiries concerning our equal opportunity policies may be referred to the University Title IX Coordinator/Compliance Officer for Section 504 of the Rehabilitation Act of 1973, Office of Affirmative Action, Richards Hall, 617-437-2133.

Family Educational Rights and Privacy Act

In accordance with the Family Educational Rights and Privacy Act of 1974, Northeastern University permits its students to inspect their records wherever appropriate and to challenge specific parts of them when they feel it is necessary to do so. Specific details of the law as it applies to Northeastern are printed in the Student Handbook and are distributed annually at registrations of the University College and graduate schools.

Fee Schedule and Academic Calendar

The Fee Schedule and Academic Calendar has been enclosed as a separate insert to this *Bulletin*. If one has not been enclosed, contact the School of Engineering Technology, 617-437-2500.

Full-Time and Day Programs

This *Bulletin* contains information about the evening and weekend programs offered by the School of Engineering Technology. If you need information about full-time or day programs offered by Northeastern University, contact the Department of Undergraduate Admissions, 139 Richards Hall at 617-437-2200.

Insufficient Enrollment Disclaimer

Northeastern University reserves the right to cancel any course if minimum enrollments are not met.

Office of Services for the Handicapped

The Office of Services for the Handicapped (OSH) provides a variety of support services and general assistance to all of Northeastern's disabled students and employees. The University's efforts to comply with section 504 of the Rehabilitation Act of 1973 are coordinated by Ruth Bork, OSH director, 5 Ell Center, 617-437-2675. (TTY number is 437-2730.)

Policy on Changes of Program

The School of Engineering Technology reserves the right to cancel, modify, or add to the courses in any curriculum. The University further reserves the right to change the requirements for graduation. Any changes that may be made from time to time relative to this policy shall be applicable to all students in the school, college, or department concerned, including former students who may reenroll.

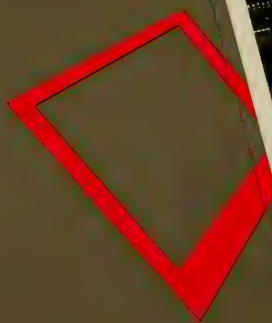
Tuition and Fees Policy

Tuition rates, all fees, rules and regulations, courses and course content are subject to revision by the President and the Board of Trustees at any time.

Cover photography: John Rae

Text photography: Josh Levine and Russ Sparkman

Northeastern University
Publications
11.89.03



1990-1991

Graduate **SCHOOLS**

COURSE DESCRIPTIONS



Northeastern University

Northeastern University
Graduate Schools
Course Descriptions
1990 -1991

The great work needs not only the flash, the inspiration, the peak experience; it also needs hard work, long training . . . succeeding upon the spontaneous is the deliberate; succeeding upon total acceptance comes criticism; succeeding upon intuition comes rigorous thought.

--Abraham Maslow

The truly important lessons prepare you for a lifetime of learning. During the undergraduate years, for example, you became adept at converting your curiosity into a powerful and focused motivational force. You developed a talent for combining your appetite for information with an ability to interpret facts through critical thinking.

As a graduate student at Northeastern University, you are challenged to reach beyond the ability to question and understand an existing body of knowledge--you will be asked to contribute new ideas--and that takes innovation.

An innovative spirit generates new ideas, methods, and technology: Marshaling that spirit, finding ways to introduce it in various situations, is what makes graduate studies so compelling. Beyond mastering your chosen academic discipline, learning to approach all tasks with critical thought and innovation will prove to be the lesson of value.

Contents

| | | | |
|---|-----------|---------------------------------------|------------|
| Graduate School of Arts and Sciences | 1 | Graduate School of | 85 |
| Anthropology and Sociology | 2 | Computer Science | |
| Biology | 7 | Graduate School of | 91 |
| Chemistry | 12 | Criminal Justice | |
| Economics | 15 | Graduate School of Engineering | 95 |
| English | 19 | Chemical Engineering | 96 |
| History | 26 | Civil Engineering | 100 |
| Journalism (School of) | 29 | Interdisciplinary Transportation | 107 |
| Law, Policy, and Society | 30 | Electrical and Computer Engineering | 107 |
| Mathematics | 31 | Biomedical Engineering | 123 |
| Physics | 35 | Industrial Engineering | 124 |
| Political Science | 37 | Mechanical Engineering | 131 |
| Psychology | 45 | | |
| Graduate School of Boston-Bouvé | 49 | Graduate School of Nursing | 141 |
| College of Human Development | | Community Health Nursing | 142 |
| Professions | | Critical Care Nursing | 143 |
| Counseling Psychology, Rehabilitation, | 50 | Primary Care Nursing | 144 |
| and Special Education | | Psychiatric-Mental Health Nursing | 146 |
| Education | 57 | Nursing Administration | 147 |
| Health, Sport, and Leisure Studies | 67 | | |
| Physical Therapy | 69 | Graduate School of Pharmacy | 149 |
| Speech-Language Pathology | 70 | and Allied Health Professions | |
| and Audiology | | Physician Assistant | 158 |
| Interdepartmental Courses | 73 | | |
| Institutes | 74 | Graduate School of | 163 |
| Workshops | 74 | Professional Accounting | |
| Graduate School of | 75 | Appendix | 165 |
| Business Administration | | Academic Calendar | 166 |

Graduate School of Arts and Sciences

Anthropology and Sociology

All courses carry three quarter-hours of credit unless otherwise specified.

Social Anthropology

Many undergraduate courses in the SOA 300 and SOA 400 series may be offered for graduate credit. Students should check the current course announcements to take advantage of these offerings.

SOA 3100 Culture Theory 4 QH

Analyzes the emergence and growth of the major theoretical orientations in contemporary anthropology: functionalism, structuralism, Marxism, and post-structuralism. Examines each theory through primary sources written by anthropologists working in the various traditions. Discusses theories as they relate to the practice of anthropology and to the social context of the anthropologists' own culture.

SOA 3102 Class and State Formation 4 QH

Compares the development of social, political, and economic stratification in some societies and the maintenance of unstratified relations in others. Critically evaluates theories about why and under what conditions societies become stratified. Examines the emergence of classes and state structures in historical and contemporary cases.

SOA 3120 Camera on Culture: Visual Anthropology

Explores how cultures are portrayed on film and examines anthropologists' use of film to gather information and represent other peoples. Discusses how postcolonial societies' filmmakers have addressed their own cultures, the experience of colonialism, and the nature of filmmaking and film/video consumption in the third world. When possible, includes lab film production.

SOA 3121, SOA 3122 Fieldwork 1, 2 4 QH each

Studies data collection through participant observation and related anthropological methods. Includes data analysis and reports. *Not offered in years in which SOC 3120 and SOC 3121 are offered.*

SOA 3145 Peasants

Examines the institutions of peasant society. Investigates the structure of traditional civilizations and the relations between urban and local communities: comparative and functional analysis of the peasant community and the dynamics of change from peasant to postpeasant and industrialized societies.

SOA 3155 Individual and Culture

Examines current theory and method in the study of the interplay between personality and culture. Discusses contributions by various disciplines.

SOA 3156 Gender, Kinship, and Social Change 4 QH

Focuses on debates surrounding the origin of the gender division of labor and the family. Examines gender relations and kinship dynamics, including family forms, in a political and economic context, using examples of egalitarian, ranked, stratified, and state-level societies. Analyzes social stratification, colonial-

ism, and capitalist development in relation to changing gender roles, and critically evaluates theories of the emergence of gender hierarchy.

SOA 3220 Culture and Mental Illness

Discusses and analyzes the nature and meaning of culture, the role of culture in personality formation, culture and anxiety, and anthropological approaches to the normal and the "abnormal." Explores the question, "Is mental illness psychological fact or cultural fiction?"

SOA 3310 Development and Decolonization

Examines the transformation of postcolonial societies through capitalist or socialist development and discusses theories of modernization, neocolonialism, and uneven development. Also explores the commercialization of agriculture, urbanization, labor migration, and economic stratification as these shape and are shaped by cultural factors.

SOA 3345 Urban Ethnography

Studies selected problems in anthropological studies of urban life, analyzing class and race dimensions of those who study and those who are studied through contemporary ethnographies. Compares studies of urban life in the United States and in the neocolonial world for underlying assumptions and for characterizations of kinship, economic, and political relations. Addresses the question of domestic fieldwork or studying one's own culture.

SOA 3355 Anthropology of Law and Conflict

Topics include settling disputes in stateless societies; forms and mechanisms of social control; law as an indicator of cultural and social norms; and the study of conflict resolution as an ethnographic tool. Requires some field research and analysis.

SOA 3360 Economic Anthropology

Focuses on debates about the nature of production, distribution, and exchange in precapitalist (egalitarian and peasant) societies. Analyzes transformations of indigenous property relations, savings and credit arrangements with capitalist colonialism and postcolonial development, and examines the uneven transition from subsistence to market economies.

SOA 3410, SOA 3411, SOA 3412, SOA 3413 3 QH each Contemporary Issues in Social Anthropology

Studies contemporary issues in the field of anthropology. Includes supervised readings and written reports on special programs.

SOA 3425 Tribal Societies and Culture

Examines the problems faced by today's tribal peoples and national minorities. Using cross-cultural case studies, students analyze the relationship of governmental policies and economic development priorities to the survival of self-identified tribal cultures and

minority populations throughout the world. Addresses questions of human rights, nationalism, cultural autonomy and resistance, and self-determination.

SOA 3440 Latin American Society and Development

Explores the process of social, economic, and cultural change in Latin America. Focusing on the present, traces class formation, agrarian structures, ethnic identity, ceremonial organization, gender roles, and political conflict since the colonial era in a range of Latin American countries. Stresses the relationship between communities and national political and economic systems. Focus over the years will alternate between Central America and Mexico and South America.

SOA 3441, SOA 3442, SOA 3443, 3 QH each

SOA 3444, SOA 3445 Ethnographic Studies

These area studies courses are offered as the department's resources permit. Topics include Latin America, the Caribbean, Africa, China/East Asia, India/South Asia, Southeast Asia, the Mediterranean, and Eastern Europe.

SOA 3600, SOA 3601, SOA 3602 Seminar 3 QH each

Discusses selected topics in the field of anthropology.

SOA 3798 Master's Paper Continuation 0 QH

SOA 3800, SOA 3801, SOA 3802 3 QH each

Directed Study in Social Anthropology

Comprises reading and empirical research in social and cultural anthropology supervised by members of the anthropological staff.

SOA 3803 Directed Study in Anthropological Theory 4 QH

Studies major contemporary orientations, including evolutionary approaches, culture area, cultural ecology, functionalism, structuralism, and analysis of current status of these and other theories. *Prereq.* *Permission of Committee on Graduate Studies.*

SOA 3810 Master's Paper in 3 QH

Social Anthropology

Comprises empirical or library research meeting the criteria for publication in a professional journal. *Supervised by members of the department.*

Sociology

Many undergraduate courses in the SOC 300 and SOC 400 series may be offered for graduate credit. Students should check the current course announcements to take advantage of these offerings.

SOC 3100 Foundations of Social Theory 1 4 QH

Studies the classic theorists including Durkheim, Weber, Marx, and others.

SOC 3101 Foundations of Social Theory 2 4 QH

Analyzes modern theorists from the 1930s onward (Parsons, Merton, Levi-Strauss, Goffman, Homans, Schutz, Garfinkel, Ricoeur, Lukacs, Habermas, and others). Stresses the social and historical context of theory construction.

SOC 3103 American Society

Studies the development of, and the changes in, the institutional structure of American society in comparison with certain other social systems.

SOC 3113 Introduction to Research Methods 2 QH

Introduces methods of social research including field study and participant observation techniques, survey techniques, interviewing and questionnaire construction, sampling procedures, experimental design, content analysis, and uses of available data. *Open only to Law, Policy, and Society students.*

SOC 3114 Introduction to Quantitative 2 QH

Research Methods

Introduces quantitative techniques of analysis. Students are expected to conduct individual research projects. *Prereq.* *SOC 3113 or equiv.* *Open only to Law, Policy, and Society students.*

SOC 3115 Statistical Methods for Sociologists 4 QH

Introduces statistical methods relevant to sociology. Topics include tabular analysis, nonparametric statistics, analysis of variance, regression analysis, path analysis, measures of association, estimation and univariate and multivariate hypothesis testing. A knowledge of elementary statistical theory is presumed.

SOC 3116 Introduction to Research Methods 4 QH

Surveys methods of social research including field study and participant observation techniques, survey techniques, interviewing and questionnaire construction, sampling procedures, experimental design, content analysis, and use of available data.

SOC 3117 Quantitative Research Methods 4 QH

Presents quantitative techniques of analysis. Students are expected to conduct individual research projects. *Prereq.* *SOC 3116 or equiv. or permission of instructor.*

SOC 3120, SOC 3121 Seminar in Qualitative 4 QH each

Analysis 1, 2
Studies qualitative techniques of analysis. Examines social-structure process and meaning in interacting groups. Students study a face-to-face group by means of participant observation using symbolic interaction concepts. *Not offered in years in which SOA 3121 and SOA 3122 are offered.*

SOC 3125, SOC 3126, SOC 3127 1 QH each

Proseminar

Focuses on issues related to graduate student life and expectations, professional and career choices, and works in progress. Students have an opportunity to explore more informally, with each other and with various faculty members, some of the important issues in the profession. *Suggested for entering students.*

SOC 3135 Issues in Social Psychology

Examines human behavior and theories of self from a sociological and psychological perspective. Gives special consideration to interpersonal relations, socialization, and symbolic interaction.

SOC 3140 Sociology of Prejudice and Discrimination

Studies the characteristics, causes, and consequences of prejudice and discrimination, with particular reference to American society.

SOC 3147 Urban Sociology

Discusses theories of the development of urban life. Compares preindustrial and industrialized urban areas. Presents methods for the study of urban social structure and change, and evaluates contemporary metropolitan action programs.

SOC 3148 Boston Seminar

Studies urban development, including environmental and historical circumstances, demands for services, response to events, and programs. Examines basis for value systems of Yankees, ethnics, and cosmopolitans, the impact on downtown and neighborhood relations, and metropolitan prospects.

SOC 3149 Metropolitan and Regional Issues

Analyzes problems, policies, programs, and activities associated with metropolitan and regional life. Includes assessment of values, institutions, networks, interest groups, decision making, service delivery, growth and development, environment, equity, and integration. Presents case studies in societal context.

SOC 3155 The Family

Analyzes social structure and social functions of the family as a social institution. Includes comparative and historical examination of relations between the family and other institutions in society.

SOC 3160 Women, Men, and Social Change

The Industrial Revolution and the corresponding changes in the labor force and patterns of domestic life have altered the sexual division of labor. In postindustrial society new institutional forms are recasting personal relations. Examines these forces of social change and their impact on sex roles.

SOC 3165 Sociology of Education

Analyzes the structure and functioning of educational institutions, and presents student, faculty, and administrative perspectives. Emphasizes the role of education in processes of socialization, social mobility, social change, and social control.

SOC 3166 Sociology and Anthropology in the Schools 4 QH

For current and perspective teachers of sociology and anthropology at the precollege and community college levels. Offers participants the opportunity to analyze curricula in their fields and consider alternative rationales for various approaches to teaching sociology and anthropology at these levels. Focuses on the potential uses of sociological and anthropological concepts in analyzing and solving educational problems. Students are expected to present either a course or unit they have prepared or a project they have planned or conducted utilizing a sociological or anthropological perspective.

SOC 3170 Intergroup Relations

Examines the relations between various racial, national, cultural, and religious groups with emphasis

on historical development. Pays particular attention to American society with its specific problems of adjustment and assimilation.

SOC 3171 Race and Ethnic Relations: A World Perspective

Offers cross-cultural analysis of race and ethnic relations in Western and non-Western societies. Explains race and ethnic relations in terms of contemporary developments, world problems, and ideological conflicts.

SOC 3175 Sociology of Work

Examines what effects the social organization of work has on the lives of workers and on the structure of society.

SOC 3176 Sociology of Occupations and Professions

Studies the relations between the occupations and professions and society. Special topics may include occupational stratification, professional group behavior, recruitment and socialization of occupations and professions, and political activism.

SOC 3185 Sociology of Deviant Behavior

Applies sociological concepts and principles to some problems of social disorganization in industrial societies. Analyzes such problems as suicide, prostitution, physical handicaps, unemployment, alcoholism, sexual deviance, and gambling.

SOC 3186, SOC 3187 Social Control 1, 2

Presents a seminar in research, theories, and methods in the sociology of social control.

SOC 3190 Sociology of Delinquency

Analyzes social and social psychological factors of delinquency and their implications for prevention, rehabilitation, and treatment.

SOC 3200 Sociology of Alcoholism

Examines four general problem areas: the conditions under which people categorize others as alcoholics; the processes by which persons so defined are assigned deviant status and assume appropriate roles and self-images as alcoholics; the development of drinking careers and their relationship to deviant subcultures; and the social situations in which people transform their deviant identities as alcoholics. Applies organizational analysis to the development and changing network of alcoholism treatment services and tries to develop some tentative generalizations on the social organization of alcoholism.

SOC 3205 Sociology of Crime and Justice

Presents a sociological and legal analysis of the criminal justice system, concentrating on police and law enforcement; plea-bargaining; courtroom research and trial strategies; sentencing; and prisoners' rights and corrections. Considers the relationship of race, social class, and crime, as well as the sociological explanations of crime causation.

SOC 3206 Sociology of Law

Reviews fundamentals of law. Includes the concept of social control, order and law, consensus and conflict, analysis of the normative-formative influences of law, mores and morals, the concept of justice, and analysis of some legal institutions.

SOC 3215 Sociology of Medicine

Studies social aspects of illness and medicine, historically and cross-culturally. Focuses on illness and the medical profession in modern society and their structural settings: the community, the hospital, the medical school. Critically examines research studies in the field and specifies problems for future research.

SOC 3225 Sociology of Aging

Examines the field of social gerontology, the nature and roots of ageism and topics such as elderly housing, life study, institutionalization, health care, retirement, leisure, and senior power.

SOC 3226 Processes of Aging

Considers socioeconomic and social psychological consequences of aging from the perspective of health-care providers. A major part of the course focuses directly on the biological changes entailed in aging and the appropriate medical management of geriatric patients. *Open to students expected to provide health-care services to geriatric patients.*

SOC 3240 Formal Organizations: Administration and Structure

Analyzes the goals and functions of modern organizations. Examines aspects of bureaucratization within business firms, public institutions, and private associations.

SOC 3245 Sociology of Poverty

Analyzes sociological perspectives on causes of poverty, public views on poverty, and institutional responses to poverty. Emphasizes a concern with policy issues and implementation of policies. *For advanced students in the social sciences and in the various human service schools in the University.*

SOC 3275 Sociology of Art

1 QH

Investigates the practices which lead to the production of artistic meaning. Topics include the relationship of art to society; the nature of artistic communities, their relationship to patronage systems and art markets; and how these systems are rooted in particular social and historical contexts.

SOC 3276 Popular Culture

Both pluralist and mass culture theories are in adequate in explaining mass popular culture; therefore, a primary objective of the course is to develop and refine an efficient theoretical framework. Problems addressed include the relationship of popular culture, high culture, and folk culture and the genesis and role of the mass media in industrial societies. Students also focus on empirical research in several forms of popular culture, including sports, rock music, and science fiction novels; and examine the organization and impact of market, stylistic shifts, and the viability of criticism.

SOC 3278 Mass Communication and Society

Studies the production, consumption, and meaning of media systems and their products in advanced industrial societies. Focuses on the legitimation and ideological function of mass media, especially its role in the reproduction and challenge of social relations. Explores the development of Western media; the eco-

nomic and social organization of media institutions and its impact on media products and their use; the existence of and possibilities for alternative media; and the impact of Western media in the third world.

SOC 3286 Sociology of Science

Presents selected topics dealing with interactions between science and society.

SOC 3300 Contemporary Sociological Theories

Analyzes major contemporary theories such as functionalism, conflict, neo-Marxism, and others. *Prereq. SOC 3100 and SOC 3101 or equiv. or permission of the instructor.*

SOC 3301 Recent Developments in Sociological Theory

This course is required for students in the PhD program who seek a comprehensive treatment of current developments in sociological theory. Among the schools that might be considered are: critical theory, modern Marxist theory, contemporary French theory, semiotics, hermeneutics, symbolic interactionist theory, and other emerging schools of thought. The specific content of the course changes periodically in order to keep the focus of the course on new horizons in theory. The relation of theory to research is also a main goal of the course. Topics selected and announced by the instructor in advance. *Prereq. SOC 3100 and SOC 3101 or equiv. or permission of instructor.*

SOC 3302 Sociology of Knowledge

Explores the relationship between the social base of a society and its intellectual products. Considers the viewpoints of authors such as Marx, Weber, Mannheim, G. H. Mead, the neo-Marxians, and other modern schools. *Prereq. SOC 3100 and SOC 3101 or equiv. or permission of instructor.*

SOC 3303 Economic Sociology

Discusses the role of economic factors in the social process. Considers both classic economic theory and its impact on classic social theory, and the potential interrelations between modern economic theory (especially model-building approaches) and general sociological problems.

SOC 3304 Feminist Theory

Traces major trends in feminist theory since the rise of the contemporary women's movement. Begins with early theories, identified as Marxist-Feminist, Socialist-Feminist, and Radical-Feminist, then considers important feminist issues: the origins and universality of women's oppression, the reproduction of gender in the family (neo-Freudian feminist and anthropological approaches), women's work under capitalism, and sexuality.

SOC 3310, SOA 3311 Social and Cultural Change 1, 2

Analyzes the changing patterns in social, economic, and political institutions. Discusses modern social trends. *Two-quarter course in conjunction with anthropology.*

SOC 3320 Multiple Regression in Sociological Analysis

Focuses on techniques of sociological analysis based on multiple regression. For example, use of coded variables, trend analysis, covariance analysis, and model testing. *Prereq. SOC 3115 and SOC 3117 or equiv.*

SOC 3321 Current Issues in Social Research

Examines selected topics in methods of social research. *Prereq. SOC 3116 and SOC 3117 or equiv. or permission of instructor.*

SOC 3322, SOC 3323 Experimental Methods in Social Research 1, 2

Studies experimental design and laboratory methods in sociology. The small groups laboratory is treated as a setting for testing sociological theory. Emphasizes techniques and problems in the creation and manipulation of social variables in the laboratory situation, while also considering the techniques of the natural experiment.

SOC 3325 Sociology of Policy, Planning, and Evaluation

Introduces the social, political, and economic factors affecting policy formation and the eventual success or failure of social programs in health, education, welfare, and urban planning. Stresses evaluation of policy alternatives and planning problems. *For advanced students in the social sciences and in the various human service schools of the University.*

SOC 3335 Seminar in Symbolic Interaction

Discusses the social psychology of groups as found in the works of Mead, Becker, Blumer, Goffman, and others.

SOC 3336, SOC 3337, SOC 3338 Seminar on Socialization 1, 2, 3

SOC 3336: Reviews theories and findings in organizational socialization. SOC 3337: Offers students the opportunity to design studies in organizational socialization. SOC 3338: Requires that students present results of their studies. *Not open to first-year students.*

SOC 3345 Community Analysis

Presents ecological theories of human relations with the physical environment. Develops the concept of, and discusses methods for, community study. Compares rural communities and urban neighborhoods. Discusses and evaluates community action programs.

SOC 3347 Seminar in Urban Social Policies 4 QH

Evaluates social science theories and methods from the perspectives of urban affairs. *Prereq. Permission of instructor.*

SOC 3355 Political Sociology

Presents sociological analysis of power relations and power systems with special attention to the bases of political power, processes of change in power, and the part played by violence and revolutionary movements.

SOC 3357 Comparative Socialism

Analyzes twentieth-century socialism from a comparative perspective. Covers the variety of "socialisms" that have developed in the Soviet bloc, China, Yugoslavia, and Cuba, as well as Western social democracy (Sweden) and Eurocommunism. Topics include political structure, class relations, industrial organization, cultural formations, dynamics of change, and democratization.

SOC 3360 Social Stratification

Places theories of inequality between groups in historical perspective, from classical to modern industrial times. Discusses and evaluates sociological research in social stratification with regard to different social and cultural groups.

SOC 3365 Social Movements

Studies various movements for social change from all points of the political spectrum. Gives special attention to the structural context, as well as to such processes of social movements as social base, leadership, strategy, and organization.

SOC 3390, SOC 3391 Seminar in Social Structure 1, 2

Relates current theories and research in sociology, social psychology, and social anthropology.

SOC 3405 Theories of Criminology

Examines theories and philosophies underlying various correctional systems, and schools of thought in criminology and penology. Traces theoretical approaches to the crime and delinquency problem from the beginnings of criminology to current thinking.

SOC 3410, SOC 3411, SOC 3412, SOC 3413 3 QH each Contemporary Issues in Sociology

Discusses contemporary issues in sociology. Includes supervised readings and written reports on special problems.

SOC 3430 Latin American Societies

Studies and analyzes selected Latin American societies with particular attention to such countries as Cuba, Mexico, Peru, and Brazil. Emphasizes urbanization and industrialization, and social and political change.

SOC 3431 Middle East Area Study

Presents a sociocultural analysis of the Middle East. Discusses ecological, structural, institutional, and normative factors in nomadic, rural, and urban life. Includes comparative regional analysis.

SOC 3470 Sociology of Religion

Offers a sociological analysis of religious institutions, and experiences in their historical and contemporary content. Considers religious and political context.

SOC 3485 Computers and Society

Offers a graduate seminar on the social impact of the computer "revolution" on the contemporary world. Topics include conditions of work, education, recreation, privacy, the computer science profession, paradigms of human thought, politics, and social change in the world economy.

SOC 3600, SOC 3601, SOC 3602 Seminar 3 QH each

Discusses selected topics in the field of sociology.

SOC 3603 Rhetoric in Sociology

Examines critically the conventional forms of sociological writings. Demonstrates how conventions differ by theoretical perspective and paradigm.

SOC 3615 Tutorial in Teaching 3 QH
Discusses issues and problems in teaching. This is a required course for all doctoral candidates and should be taken during a quarter when the student has major responsibility for designing and executing a course in either sociology or anthropology. *Open to doctoral candidates only.*

SOC 3620, SOC 3621, SOC 3622 Doctoral Proseminar 1 QH each

Designed to help socialize doctoral candidates for participation as professional sociologists and anthropologists. Topics include the nature of intellectualism and the functions of an intellectual in society today, the university as a structure and as a community of scholars, the nature of professional organizations, teaching sociology and anthropology, the organization of sociological and anthropological research, ethics in the profession, and the nature of applied sociological

and anthropological work. Offers participants the opportunity to acquire practical experience in self-presentation and giving colloquia. *Prereq. SOC 3321 and SOC 3300 or SOC 3301 or SOC 3302 or permission of instructor. Required of all doctoral candidates.*

SOC 3798 Master's Paper Continuation 0 QH

SOC 3799 Doctoral Dissertation Continuation 0 QH

SOC 3800, SOC 3801, SOC 3802 3 QH each

Directed Study in Sociology

Comprises reading and research directed by a faculty member. *Open to doctoral candidates only.*

SOC 3810 Master's Paper in Sociology 3 QH

Comprises empirical or library research meeting the criteria for publication in a professional journal. *Supervised by members of the department.*

SOC 3820 Doctoral Dissertation 0 QH

Biology

BIO 3411 Evolution 4 QH

Reviews the theories of evolution, evidence, and mechanisms of speciation. Lab consists of term paper and presentation. *Prereq. BIO 1104 or BIO 1107 and BIO 1260.*

BIO 3441 Vertebrate Zoology 4 QH

Surveys the diversity, systematics, anatomy, physiology, and ecology of all vertebrate classes of New England. Lab consists of field observations, museum trips, and specimen study. *Prereq. BIO 1104 or BIO 1107 and BIO 1211.*

BIO 3446 Ornithology 4 QH

Examines the diversity, systematics, anatomy, physiology, and ecology of the birds of the world. Lab consists of field observations and specimen study. *Prereq. BIO 1104 or BIO 1107 and BIO 1211.*

BIO 3448 Mammalogy 4 QH

Studies the diversity, systematics, anatomy, physiology, and ecology of the mammals of the world. Lab consists of field collection and specimen preparation and study. *Prereq. BIO 1104 or BIO 1107 and BIO 1211.*

BIO 3450 Immunology 4 QH

Presents an overview of the structure and function of genes, proteins, and cells involved in the generation of the immune response. Emphasizes molecular immunology and immunogenetics. *Prereq. BIO 3564 and BIO 3565; concurrent registration in BIO 3565 acceptable.*

BIO 3460 Current Topics in Cell Biology 4 QH

Explores topics of current interest in the biochemistry and molecular biology of cells. Topics may include protein synthesis and translocation; biosynthesis and recycling of membranes; receptor structure and function; organelle structure, biosynthesis, and function;

and DNA replication and macromolecular assemblies. *Prereq. BIO 3564 and BIO 3565 or equivs.*

BIO 3501 Biological Laboratory Computing 4 QH

Introduces students to the basic techniques of interfacing biological experiments to computers, using lectures that present problems to be solved by applying contemporary microcomputing devices. Surveys the architecture of a lab computing system; discusses problems inherent in applying contemporary lab input/output devices; and provides the background in graphics and database management necessary for generating reports.

BIO 3509 Principles of Systematics 4 QH

Surveys the theories and techniques employed in plant and animal systematics and the rules according to the International Codes of Zoological and Botanical Nomenclature. *Prereq. Permission of instructor.*

BIO 3510 Environmental and Population Biology 2 QH

Examines physiochemical factors influencing and influenced by organisms. Explores interaction among individual organisms and among species. Students are expected to participate in lectures and labs given for BIO 1211, and are assigned individual work on specialized aspects of ecology. *Prereq. One year of general biology, including plant and animal biology. Open only to graduate students completing deficiencies in entrance requirements.*

BIO 3512 River Ecology Laboratory 3 QH

Comprises two four-hour sessions per week (combined lecture and lab). Covers chemical determinations, measurement of primary and secondary production, and organismal identification in flowing waters of different types.

BIO 3513 Benthic Marine Ecology: Techniques 4 QH

This advanced graduate-level course examines new research techniques for studying the ecology, behavior,

and biology of marine benthic invertebrates. The focus is on a small number of field and lab techniques, rather than attempting an exhaustive survey of all the existing research methods in benthic ecology. Each lab/field exercise is conducted as a mini research project. Students discuss the philosophy of experimental design and learn research techniques, including spectrophotometric analysis of sediment nutrient content, hydrodynamical analysis of larval recruitment, quantification of invertebrate growth, current velocity measurement, and multivariate statistical analysis.

BIO 3514 Salt Marsh Ecology 3 QH

Studies the mechanisms of salt marsh formation, including major plants and the factors affecting distribution; the distribution and interaction of animals; productivity; and food webs and energy flow. Discusses the relationship of marsh to bay in the estuarine system, marsh pools as a sub-habitat, and the effect of people using the tidal marsh. *Prereq.* BIO 1211.

BIO 3515 Salt Marsh Ecology Laboratory 2 QH

Examines major plants and animals of marsh surfaces and pools. Analyzes distribution in field, measurement of plant productivity, fish feeding, and the ecology of mosquitos and zooplankton. Offers a mixture of field and lab work, with studies varied according to the season. *Prereq.* BIO 3514.

BIO 3516 Aquatic Ecology

Studies rivers, lakes, and estuaries. Focuses on physical and chemical factors, seasonal and regional variations of these factors, interactions between these factors and the effects on the biotic community. Examines examples of current and classical ecological research in each of the three aquatic communities. *Prereq.* BIO 1211.

BIO 3517 Lake Ecology Laboratory 3 QH

Comprises two four-hour sessions per week (combined lecture and lab). Topics include chemical determinations, measurement of primary and secondary production, and organismal identification in lakes of different types.

BIO 3518 Ecology of Salt Marshes 3 QH

Surveys fauna and flora, environmental factors affecting them, and current biological and social problems associated with salt marshes. Meets for two lectures of one-to-three hours each, and one full day of lab for six weeks during the summer quarter. *Prereq.* BIO 1211 and BIO 3511 or equiv.

BIO 3519 Ecology of Rocky Shores 4 QH

Examines current ecological concepts regarding rocky intertidal and subtidal communities. Covers the influence of biotic and abiotic factors on composition, distribution, and diversity of plant and animal species.

BIO 3520 Environmental Microbiology 4 QH

Studies the microbial environment and ecology of the cell. Explores interactions between microbial populations, stressing soil and freshwater associations. *Prereq.* BIO 1320 or equiv.

BIO 3521 Food Microbiology 3 QH

Investigates microbiology of food with emphasis on pathogenic types and their interactions with other

groups indigenous to food. Discusses food fermentations, food processing, and environmental factors influencing growth and development of microorganisms in food. *Prereq.* BIO 1320 or equiv.

BIO 3522 Food Microbiology Laboratory 2 QH

Focuses on detection, quantification, and isolation of microorganisms and their products of significance in food with emphasis on the pathogenic types. *Prereq.* BIO 3521; may be taken concurrently.

BIO 3525 Theoretical Ecology 4 QH

Studies population and community ecology, with emphasis on mathematical modeling of ecological processes. Recognizes current ecological literature, including theory developed over the past twenty years in such areas as energetics of organism growth, population dynamics and regulation, and the organization and temporal dynamics of entire communities. Gives students the applied mathematical tools necessary to work with and understand current modeling approaches. *Prereq.* Introductory ecology or evolution, and one year of calculus.

BIO 3527 Animal Virology 3 QH

Examines physical and chemical properties of viruses, viral replication, genetics, cytopathology, and tumor viruses. Covers medical virology, including pathogenesis, clinical features, epidemiology, and immunization of the common viral diseases. *Prereq.* BIO 1320 or equiv.

BIO 3528 Animal Virology Laboratory 2 QH

Studies cultivation and identification of viruses. Includes use of animals, eggs, and animal cell cultures for viral assays. *Prereq.* BIO 3527; may be taken concurrently.

BIO 3531 Plant Growth and Reproduction 4 QH

Investigates plant hormones, growth, development, and physiology of reproduction.

BIO 3547 Biomechanics 1, Theory 4 QH

Introduces engineering theory and techniques as applied to the disciplines of morphology, evolution, and ecology. Includes material properties, structural elements and systems, and elementary fluid dynamics. Lab emphasizes biological materials in a mechanical sense, the physical biology of flow, and an examination of the fundamental principles of physical laws that affect living organisms. *Prereq.* Permission of instructor.

BIO 3548 Biomechanics 2, Applications 4 QH

Presents a forum for research in biomechanics in which students are expected to develop and execute a research project. In addition, current areas of biomechanical research will be reviewed and evaluated. *Prereq.* BIO 3547 and permission of instructor.

BIO 3549 Physiology and Biomechanics of Animal Activity 3 QH

Offers an integrated study of the physiological and biomechanical systems that support locomotory activity in animals. The first part is devoted to the structure and function of skeletal muscle and to respiratory and cardiovascular adaptations for activity. The remain-

der integrates physiological and biomechanical information related to flying, swimming, and terrestrial locomotion. *Prereq.* General physiology.

BIO 3550 Cardiovascular Physiology 3 QH

Studies the physiology of blood cells, anemia, polycythemia immunity, and allergy. Examines electrophysiology of the heart, cardiac cycle, EKG, hemodynamics, capillary dynamics, pulmonary circulation, cardiovascular reflexes, cardiac output, and venous return. Also covers cardiac failure, coronary circulation, atherosclerosis, hypertension, cerebral circulation, and circulatory shock.

BIO 3551 Cardiovascular Physiology Laboratory 1 QH

Offers three hours of laboratory study per week. *Prereq.* BIO 3550.

BIO 3552 Osmotic and Ionic Regulation 2 QH

Investigates comparative physiology of regulation and transport of water and the principal solutes in animals. Discusses principles and underlying mechanisms as well as examples selected from a variety of phyla. *Prereq.* Basic physiology.

BIO 3553 General Physiology of Invertebrates 4 QH

Reviews basic animal functions as manifested among the major groups of invertebrates, with comparisons to the vertebrates, especially aquatic vertebrates. Considers the cellular and biochemical bases for the functions, their control, their adaptiveness to diverse environments, and their evolutionary implications. Topics usually include respiration, circulation, nutrition, metabolism, excretion, salt and water balance, temperature responses, biological clocks, sensory organs, and various effector organs.

BIO 3554 Comparative Vertebrate Physiology 4 QH

Considers physiological principles in the context of the phylogenetic diversity of the vertebrates, histories and environments and makes comparisons with invertebrate systems when appropriate. Topics include energetics, temperature regulation, skeletal muscle, and salt and water balance. Lab. *Prereq.* BIO 1261 or equiv.

BIO 3555 Topics in Ecological Physiology 2 QH

Explores physiological studies that reveal how animals have adapted to aspects of their life histories and environments. Illustrates how studies that cross the boundaries between ecology and physiology enrich our understanding of animal function. Selects topics from the current literature and covers terrestrial, freshwater, and marine ecosystems.

BIO 3558 Vertebrate Endocrinology 3 QH

Studies principles of hormonal regulation of physiological processes in vertebrates, mechanisms of hormone action, and neuroendocrine relationships.

BIO 3559 Animal Nutrition 2 QH

Offers detailed consideration of organic and inorganic nutritional requirements of humans and selected animals. Covers digestion, absorption, and metabolism of nutrient materials. Examines role of vitamins, minerals, and trace elements in metabolism. Topics also include variation in nutritional needs among normal individuals and in various physiological and genetic patholo-

gies, and evaluation of food additives and of permissible levels of toxic materials in food. *Prereq.* Basic biochemistry or permission of instructor.

BIO 3560 Genetics and Developmental Biology 2 QH

Elaborates the classic laws of heredity, including cytogenetics and chemical basis of heredity. Presents selected examples of the development of form and function. Requires that students participate in lectures and labs given for BIO 1260 and perform extra individual work. *Prereq.* General biology. *Open only to graduate students completing deficiencies in entrance requirements.*

BIO 3561 Cell Physiology and Biochemistry 2 QH

Examines basic chemical and physical processes of cells related to their fine structure; oxidative and intermediary metabolism, photosynthesis, and membrane phenomena; movement; and chemical and physical processes of prokaryotic and eukaryotic cells. Requires that students participate in lectures and labs given for BIO 1261 and perform extra individual work. *Prereq.* General biology, college physics, and organic chemistry. *Open only to graduate students completing deficiencies in entrance requirements.*

BIO 3563 General Biochemistry Laboratory 4 QH

Introduces modern research techniques used in biochemistry and molecular biology. Topics include purification and characterization of proteins, kinetic properties of enzymes, isolation of high molecular weight DNA, recombination of DNA molecules in vitro, isolation of bacterial clones containing recombinant molecules, and in vitro mutagenesis. The course includes two hours of lecture and seven hours of lab. *Prereq.* Permission of instructor.

BIO 3564 General Biochemistry 1 4 QH

Surveys biochemistry emphasizing protein structure, the nature of enzymic catalysis, bioenergetics, and the metabolism of carbohydrates, lipids, and amino acids. *Prereq.* organic chemistry and introductory biochemistry or equiv.

BIO 3565 Molecular Biology 4 QH

Emphasizes experimental design and proof in macromolecular chemistry and genetics. Studies current theories of the detailed molecular mechanisms for the preservation, expression, and evolutionary development of biological information. Emphasizes applications to general biological and health problems. *Prereq.* BIO 3564 or equiv.

BIO 3566 General Biochemistry 3 4 QH

Emphasizes the structure and function of organelles, mechanisms of hormonal control of metabolism, and gene regulation. *Prereq.* BIO 3564 and BIO 3565 or equiv.

BIO 3569 Microbial Genetics 3 QH

Studies the principles and practical application of the genetics of microorganisms. Emphasizes genetic exchange in bacteria mediated by bacteriophage and plasmids. Also discusses several eukaryotic systems. *Prereq.* BIO 1320 or equiv.

BIO 3573 Ocean, Coastal, and Shore Studies for Teachers 4 QH

Introduces oceanography, marine biology, and marine ecology, with an emphasis on developing simple classroom and field activities for high school curricula. *Geared for high school teachers and potential teachers.*

BIO 3577 Malacology 4 QH

Investigates functional morphology, embryology, systematics, and ecology of the major groups of molluscs. *Prereq. Invertebrate zoology.*

BIO 3601 Biological Electron Microscopy 4 QH

Presents techniques of electron microscopy applied to biological materials. Discusses specimen preparation, fixation, thin-sectioning, staining, operation of electron microscope, photographic techniques, and interpretation of electron micrographs. Requires student seminars and project. *Prereq. Permission of instructor.*

BIO 3605 Developmental Neurobiology 3 QH

Provides an overview of developmental neurobiology, focusing on mechanisms for the formation and differentiation of nervous systems and nerve cells. Examines the relationship between nervous system development and behavior development. Topics include the early formation of nervous systems, pattern formation, neural movement and migration, growth and differentiation of nerve cells, formation of specific synaptic connections between cells, neural plasticity, and modification of neural organization by the environment. Topics not restricted to the embryology of any particular animal group (for example, vertebrates or invertebrates), but organized around the variety of animals and experimental preparations used to study neural development mechanisms. *Prereq. BIO 1452 or equiv.*

BIO 3607 Advanced Developmental Biology 3 QH

Studies current concepts of animal and plant development at the molecular and physiological levels. Topics include nucleic acid and protein synthesis in development, metabolic activation at fertilization, regulation of the eukaryotic genome, control of cell differentiation, and molecular communication between cells. Stresses reading and interpretation of the primary literature. Includes three hours of lecture per week.

BIO 3608 Advanced Developmental Biology Laboratory 2 QH

Analyzes the fundamental problems of development through experimental techniques. Covers the culture of vertebrate and invertebrate embryos, microsurgical analysis of morphogenesis, biochemistry of development, cell-cell interactions, and organ and tissue culture. Includes five hours of lab per week. *Prereq. BIO 3607 or permission of instructor.*

BIO 3609 Cellular Aspects of Development 3 QH

Studies animal and plant development at the cellular level. Topics include cell-cell interaction, cell surface differentiation, differential cell adhesion, genetic and epigenetic control of pattern formation, and ultrastructural aspects of fertilization and development. Stresses reading and interpretation of the primary literature. Includes three hours of lecture per week.

BIO 3610 Human Ecology

Examines human tolerance for natural and unnatural environmental factors and man's activities affecting these factors. Studies man, food, and population dynamics.

BIO 3617 Environmental Law 2 QH

Reviews the scientific information required for implementation of the legal and political aspects of environmental management. Discusses the role of the scientist as an expert witness. Studies scientific and legal predictability. Presents analyses of suitable dynamic models and case law with the goal of improving the results of legal, political, and scientific decisions bearing upon remedial environmental management. *Prereq. Biology core and first course in physiology, such as BIO 1258 and BIO 1259.*

BIO 3620 Industrial Microbiology 3 QH

Investigates microorganisms and methods employed in production of products of economic and medical importance, decomposition of wastes, and control of desirable and unwanted processes and biodeterioration. Emphasizes fermentation processes. *Prereq. BIO 1420 or equiv., or permission of instructor.*

BIO 3621 Industrial Microbiology Laboratory 2 QH

Offers lab and discussion seminar sessions devoted to the study of selected commercial processes.

BIO 3652 Comparative Neurobiology 3 QH

Presents a cellular approach to structure and function of the nervous system. Topics include neuronal anatomy, cellular properties of single neurons, synaptic transmission, integration in nerve cells, nerve networks, sensory systems, motor systems, sensory-motor integration, specification of neuronal connectivity, and phylogeny of nervous systems. *Prereq. General (animal) physiology.*

BIO 3657 Neurophysiology Laboratory 2 QH

Introduces neurophysiological methods. *Prereq. BIO 3652; may be taken concurrently.*

BIO 3661 Human Genetics 3 QH

Applies basic genetic principles to the study of variability in humans. Focuses primarily on cytogenetics, biochemical genetics, monogenetics, and multifactorial inheritance and population genetics. Topics of special interest include sex determination and differentiation, early embryology, twinning, birth-defect etiology, prenatal diagnosis, and genetic counseling. *Prereq. BIO 1260 or equiv.*

BIO 3662 Immunochemistry 4 QH

Involves intensive discussion and application of modern immunochemical topics and lab techniques. Topics include in vitro immunization of spleen cells, preparation of monoclonal antibodies, antibody-labelling procedures, enzyme-linked immunoassays (ELISA), immunofluorescence, immunoaffinity chromatography, and immunoelectrophoresis. The course consists of two hours of lecture and six hours of lab per week in two sessions of four hours each.

BIO 3663 Molecular Biology of Viruses 4 QH
Studies the growth of selected DNA and RNA viruses. Topics will include viral transcription, replication, control of viral growth and interactions with the host cell both in lytic growth and viral oncogenesis. *Prereq.* BIO 3565 or equiv.

BIO 3665 Biochemical Adaptation 3 QH
Living systems share, at the biochemical level, common mechanisms of enzymatic catalysis, energy transformation, storage and expression of genetic information, and development, growth, and differentiation. Despite this fundamental unity, organisms have evolved adaptive biochemical modifications that enable surviving and reproducing in diverse natural environments. This syllabus focuses on the fundamental strategies of adaptation and respiratory proteins, water-solute adaptations, and adaptations to extreme temperatures and to the deep sea. *Prereq.* BIO 3564 or permission of instructor.

BIO 3667 Biochemistry Laboratory Rotation 1 3 QH
Offers experience in biochemical research; students spend six weeks in each of two labs during the winter quarter. *Required of all first-year graduate students in biochemistry, cell physiology, and molecular biology.*

BIO 3668 Biochemistry Laboratory Rotation 2 3 QH
Offers a continuation of BIO 3667 during the spring quarter.

BIO 3669 Biochemistry Laboratory Rotation 3 3 QH
Offers a continuation of BIO 3668 during the summer quarter. Intended for students who have not yet chosen a lab in which to carry out thesis work.

BIO 3670 Developmental Biology of Marine Invertebrates 4 QH
Offers descriptive and experimental studies of embryonic and larval development of marine invertebrates. Lab work includes observation and experimentation using live material from a broad spectrum of invertebrate phyla. (Marine Science and Maritime Studies Center.)

BIO 3672 Ichthyology 4 QH
Studies natural history and systematics of fishes, with emphasis on marine species. (Marine Science and Maritime Studies Center.) *Prereq.* Comparative anatomy or vertebrate zoology.

BIO 3690 Seminar 1 QH
Examines various topics and recent developments in botany, biochemistry, microbiology, molecular biology, physiology, and zoology in depth. Emphasizes student presentations. *To facilitate the planning of assignments, students are urged to contact the instructor during the quarter before the seminar is to be offered.*

BIO 3699 Doctoral Dissertation 0 QH
Requires original research in depth, representing a significant contribution of new biological knowledge, and a written dissertation thereon, under the supervision of a graduate faculty member.

BIO 3701 (1 QH), BIO 3702 (2 QH), BIO 3703 (3 QH), BIO 3704 (4 QH) Master's Thesis
Presents research methods and their application to a specific problem, under the direction of a graduate faculty member.

BIO 3711 (1 QH), BIO 3712 (2 QH), BIO 3713 (3 QH), BIO 3714 (4 QH) Special Investigations in Biology
Involves faculty-guided studies that are not directly related to research pursued for thesis or dissertation. May take the form of a special course.

BIO 3721 (1 QH), BIO 3722 (2 QH), BIO 3723 (3 QH), BIO 3724 (4 QH) Special Topics in Biology
Offers special study of a selected topic under the direction of a faculty member, preliminary to submission and approval of MS thesis proposal or MS in literature dissertation proposal. Credits are convertible to MS thesis or MS dissertation.

BIO 3731 (1 QH), BIO 3732 (2 QH), BIO 3733 (3 QH), BIO 3734 (4 QH) Master's Literature Dissertation
Focuses on extensive research of the primary literature under direction of a graduate faculty member, leading to a comprehensive written review of a significant biological problem and an oral examination.

BIO 3741 (1 QH), BIO 3742 (2 QH), BIO 3743 (3 QH), BIO 3744 (4 QH) Doctoral Research
Presents research methods and their application to a specific problem, under the direction of a graduate faculty member.

BIO 3790 Perspectives in Biology 1 QH
Discusses current developments in one of the fields of biology. Each weekly meeting will focus on a presentation by an invited expert. In-class discussion must be supplemented by written assignments. No more than 2 QH of this course may be applied to satisfy the 4 QH seminar requirement for the MS or MSHS degree.

BIO 3798 Master's Thesis Continuation 0 QH

BIO 3799 Doctoral Dissertation Continuation 0 QH

Chemistry

All courses carry two quarter-hours of credit unless otherwise specified.

I. Introductory Courses

CHM 3231 Analytical Chemistry 1 QH
Introduces analytical chemistry to students whose background in the subject is deemed inadequate. *Prereq.* Permission of the departmental academic standing committee.

CHM 3271 Organic Chemistry 1 1 QH
Introduces organic chemistry to students whose background in the subject is deemed inadequate. *Prereq.* Permission of the departmental academic standing committee.

CHM 3272 Organic Chemistry 2 1 QH
Continues CHM 3271. *Prereq.* Permission of the departmental academic standing committee.

CHM 3273 Organic Chemistry 3 1 QH
Continues CHM 3272. *Prereq.* Permission of the departmental academic standing committee.

CHM 3381 Physical Chemistry 1 1 QH
Offers a beginning course in physical chemistry concentrating on chemical thermodynamics for students whose background in the subject is deemed inadequate. *Prereq.* Permission of the departmental academic standing committee.

CHM 3382 Physical Chemistry 2 1 QH
Continues CHM 3381. Concentrates on phase equilibria, solutions, kinetic theory of gases, and chemical kinetics. *Prereq.* Permission of the departmental academic standing committee.

CHM 3383 Physical Chemistry 3 1 QH
Offers a beginning course in physical chemistry, concentrating on quantum chemistry, particles and waves, and Schrodinger wave mechanics for students whose background in the subject is deemed inadequate. *Prereq.* Permission of the departmental academic standing committee.

CHM 3431 Instrumental Analysis 1 QH
Offers a beginning course in instrumental analysis for students whose background in the subject is deemed inadequate. *Prereq.* Permission of the departmental academic standing committee.

CHM 3441 Inorganic Chemistry 1 QH
Offers a beginning course in inorganic chemistry for thesis students whose background in the subject is deemed inadequate. *Prereq.* Permission of the departmental academic standing committee.

CHM 3461 Identification of Organic Compounds 1 QH
Offers a beginning course in the identification of organic compounds dealing with the qualitative analysis of organic compounds and mixtures, using physical methods. Designed for students whose background in

the subject is deemed inadequate. *Prereq.* Permission of the departmental academic standing committee.

CHM 3510 Special Projects in Chemistry 4 QH
Offers lab studies for nonthesis research. *Prereq.* Permission of the departmental academic standing committee.

II. Required Regular Courses

CHM 3521 Analytical Separations
Studies theory and practice of analytical separation techniques. Emphasizes fundamentals as they relate to practice. Topics for examination are based mainly on chromatographic processes including gas and high speed liquid chromatography. Other topics include zone refining, liquid-liquid extraction, and electrophoresis.

CHM 3522 Advanced Analytical Separations
Continues CHM 3521. *Prereq.* CHM 3521.

CHM 3523 Electroanalytical Chemistry 1
Examines theory, practice, instrumentation, and applications of selected electroanalytical methods of analysis. Topics will be selected from among the following methods: pH, ion selective electrodes, potentiometric titrations, voltammetry, coulometry, and conductivity measurements.

CHM 3524 Electroanalytical Chemistry 2
Offers a continuation of CHM 3523. Considers equilibrium and nonequilibrium techniques in electroanalytical chemistry. Covers electrode processes, chronopotentiometry, cyclic voltammetry, and recent advances in electroanalytical chemistry. *Prereq.* CHM 3523.

CHM 3525 Optical Methods of Analysis 1
Studies theory and principles of molecular absorption and emission processes, instrumentation for optical methods of analysis, and specific applications and approaches for use of optical methods. Specific topics include ultraviolet-visible, fluorescence/phosphorescence, infrared, Raman, refractometry, interferometry, polarimetry, circular dichroism, optical rotatory dispersion, light scattering for polymer analysis, optical absorption/emission detectors for HPLC, chemiluminescence, micellar enhancement in spectroscopy, and other special topics of recent development and application.

CHM 3526 Optical Methods of Analysis 2
Examines principles and applications of atomic spectroscopy. Discusses such topics as atomic emission, atomic absorption, atomic fluorescence, X-ray absorption, fluorescence and diffraction, and electron.

CHM 3527 Analytical and Organic Mass Spectrometry

Covers theory and practice of mass spectrometry in chemical analysis. Studies principles of formation of mass spectra of organic compounds, and modern ancillary techniques using mass-spectrometric detectors. *Prereq.* One year of organic chemistry and instrumental analysis.

CHM 3529 Chemical Instrumentation 1: Measurements and Control

Presents a lecture lab course illustrating the design of electronic instruments used for chemical measurements. Topics include circuit analysis, transducer characteristics, circuits using basic semiconductor devices, integrated circuits, signal amplification, and signal processing. Emphasizes interfacing and interrelation of circuits.

CHM 3530 Chemical Instrumentation 2: Computer Interfacing

Offers a lecture lab course illustrating the interface to chemical instruments. Topics include digital logic, computer architecture, data processing, A/D and D/A conversions, and parallel and serial input/output. Provides detailed coverage of standard interfaces such as the 20 mA current loop, RS-232C, and the IEEE-488 GPIB. *Prereq.* CHM 3529.

CHM 3531, CHM 3532 Topics in Analytical Chemistry 1, 2

Presents selected topics of current importance in analytical chemistry. *Prereq.* Permission of instructor.

CHM 3541 Advanced Inorganic Chemistry 1

Discusses application of basic quantum chemistry to inorganic systems. Covers Russell-Saunders and j-j coupling, stereochemistry of nontransition-metal compounds, and bonding and structure of electron-deficient systems.

CHM 3542 Advanced Inorganic Chemistry 2

Covers magnetic properties; electronic spectra and selection rules; thermodynamic stability of coordination compounds; and experimental techniques of inorganic chemistry. *Prereq.* CHM 3541.

CHM 3543 Advanced Inorganic Chemistry 3

Examines crystal symmetry. Offers introduction to theory of solids; semiconductors and metals; non-stoichiometric compounds; and solid-state reactions. Application of molecular orbital theory. Covers determination of electron distribution in transition metal compounds, Mossbauer spectroscopy, and advanced magnetochemistry. *Prereq.* CHM 3542 and CHM 3541.

CHM 3561, CHM 3562 Advanced Organic Chemistry 1, 2

Presents an intensive survey of organic reactions. Uses modern concepts of structure and mechanism to correlate factual material. *Prereq.* One year of organic chemistry.

CHM 3563 Physical Organic Chemistry

Examines topics in basic physical organic chemistry, including molecular polarity, equilibrium and kinetics, reactivity and structure, solvent effects, acid-base catalysis, orbital symmetry, and aromaticity. *Prereq.* CHM 3562 or permission of instructor.

CHM 3564 Spectrometric Identification of Organic Compounds

Studies interpretation of the ultraviolet, infrared, and nuclear magnetic resonance spectra of organic compounds. *Prereq.* One year of organic chemistry.

CHM 3581 Chemical Thermodynamics 1

Covers First Law of Thermodynamics, Thermochemistry Second and Third Laws, free energies, and reaction and phase equilibria. *Prereq.* Permission of instructor.

CHM 3582 Chemical Thermodynamics 2

Introduces partial molar properties, solutions, and electrolytes. Focuses on statistical analogues of entropy and free energy, and partition functions. *Prereq.*

CHM 3583 Chemical Thermodynamics 3

Explores statistical thermodynamics applied to gases, liquids, solids, and irreversible thermodynamics. *Prereq.* CHM 3582 and CHM 3592.

CHM 3591 Introductory Quantum Chemistry 1

Introduces quantum mechanics and applications to simple systems. Topics include: perturbation theory and applications, harmonic oscillator, rigid rotor and applications to microwave and infrared spectroscopy, simple atoms. *Prereq.* One year of physical chemistry.

CHM 3592 Introductory Quantum Chemistry 2

Examines the variational method, the chemical bond, and the LCAO method. Surveys group theory and applications, molecules and Woodward-Hoffmann rules. *Prereq.* CHM 3591.

CHM 3593 Introductory Quantum Chemistry 3

Surveys applications of group theory and simple approximate theories to conjugated molecules. Studies the SCF method and its application to atoms and molecules, and applications to molecular spectroscopy. *Prereq.* CHM 3592.

CHM 3594 Chemical Kinetics

Explores use of experimental data to deduce the rate law of a reaction. Covers mechanisms deduced from rate laws, and the influence of experimental error on precision of rate constants and activation energies. Examines collision and transition-state theories of reaction rates. *Prereq.* One year of physical chemistry.

III. Advanced Courses**CHM 3641 Coordination Chemistry**

Discusses solution phase properties of coordination compounds and experimental methods for the study of thermodynamics stability and kinetic lability. Topics also include kinetics and mechanism of solvent exchange and substitution reactions at transition metal centers. Investigates the classification of redox reaction mechanisms, Marcus theory, and phenomenological mechanisms. *Prereq.* CHM 3543.

CHM 3642, CHM 3643, CHM 3644, CHM 3645 Special Topics in Inorganic Chemistry 1, 2, 3, 4

Focuses on advanced topics of importance in inorganic chemistry including advanced ligand field theory: crys-

tal field theory of ions in weak and strong fields. Examines molecular orbital theory of transition metal complexes. Analyzes the crystal structure determination in solids: crystallography, X-ray, electron and neutron diffraction techniques applied to inorganic, bio-inorganic, and other solids. Introduces resonance spectroscopy in inorganic chemistry, including electron spin, nuclear magnetic, and nuclear quadrupole resonance; and Mossbauer spectroscopy. Considers solid-state chemistry: thermal, magnetic and transport properties, phase transformations and crystal defects; surface effects, and material preparation techniques. *Prereq.* CHM 3542 and permission of instructor.

CHM 3661, CHM 3662 Organic Stereochemistry and Reaction Mechanisms 1, 2

Studies interrelations of the stereochemistry of organic molecules with their physical and chemical behavior. Examines conformational analysis, and the effects of spatial relationships on transition states, equilibria, and reaction rates as an introduction to the study of organic reaction mechanisms. *Prereq.* CHM 3563.

CHM 3663, CHM 3664 Organic Reaction Mechanisms and Organic Synthesis 1, 2

Discusses the fundamental factors influencing the courses of organic reactions. Topics include substitution reactions, pericyclic reactions, and synthetic methods as an introduction to organic synthesis. *Prereq.* CHM 3662 (may be taken concurrently).

CHM 3671, CHM 3672, CHM 3673 Special Topics in Organic Chemistry 1, 2, 3

Covers selected topics of current importance in organic chemistry. *Prereq.* CHM 3562 and permission of instructor.

CHM 3681, CHM 3682, CHM 3683 Special Topics in Physical Chemistry 1, 2, 3

Studies advanced topics of importance in physical chemistry including quantum chemistry: linear algebra and the formulation of quantum theory. Examines angular momentum, group theory, small molecules, and time-dependent theory and selected advanced topics. Explores statistical mechanics and quantum statistics. Topics also include electrons in metals, photons, and phonons; superconductivity; fluctuations, noise, and irreversible thermodynamics; transport phenomena; and phase transitions of high order. *Prereq.* Permission of instructor.

CHM 3800 Analytical Seminar

1 QH

Focuses on oral reports by the participants on current investigations in analytical chemistry. *Prereq.* Enrollment in full-time program.

CHM 3801 Inorganic Seminar

1 QH

Focuses on oral reports by the participants on current investigations in inorganic chemistry. *Prereq.* Enrollment in full-time program.

CHM 3802 Organic Seminar

1 QH

Presents oral reports by the participants on current investigations in organic chemistry. *Prereq.* Enrollment in full-time program.

CHM 3803 Physical Chemistry

1 QH

Considers oral reports by the participants on current investigations in physical chemistry. *Prereq.* Enrollment in full-time program.

CHM 3810 Master's Research

6 QH

Offers the chance to conduct original research, under supervision of a faculty member, leading to a written thesis thereon or to the establishment of doctoral candidacy.

CHM 3820 Doctoral Research and Dissertation

0 QH

Offers the opportunity to complete original research in depth, representing a significant contribution of new chemical knowledge, and a written dissertation thereon, under the supervision of a faculty member. *Prereq.* Doctoral candidacy.

IV. Electives

INT 3101 Biochemistry 1

Discusses the structures and chemistries of carbohydrates, proteins, lipids, nucleic acids, and selected cofactors. *Prereq.* One year organic chemistry.

INT 3102 Biochemistry 2

Discusses enzymes, enzyme kinetics, and mechanisms of enzyme reactions, of intermediary metabolism and of bioenergetics, biological oxidation-reduction reactions and the electron transport chain. Considers carbohydrate metabolism including the glycolytic pathway, the citric acid cycle and the pentose phosphate pathway. *Prereq.* INT 3101.

INT 3103 Biochemistry 3

Continuation of intermediary metabolism from INT 3102, including lipid, protein, and nucleic acid metabolism, photosynthesis, and cell regulation. *Prereq.* INT 3102.

Economics

All courses carry three quarter-hours of credit unless otherwise specified.

ECN 3005 General Economics 0 QH

Surveys macroeconomic and microeconomic concepts, theories, and techniques for students with a limited background in economics or who need a refresher course.

ECN 3010 Introduction to Microeconomic Theory 0 QH

Covers basic microeconomic theory, including consumption, production and cost theory, market structure, and welfare economics. Designed for MA degree students who need to improve their background in micro theory. Carries no academic credit toward the MA or PhD programs.

ECN 3020 Introduction to Macroeconomic Theory 0 QH

Covers basic Keynesian macroeconomic theory, emphasizing analytical concepts and tools, with some application to macroeconomic problems and public policy. Designed for MA degree students who need to improve their background in macro theory. Carries no academic credit toward the MA or PhD programs.

ECN 3030 Introduction to Mathematics for Economists 0 QH

Acquaints students with the matrix algebra and elementary calculus necessary for quantitative economics: simultaneous linear systems; polynomial, logarithmic, and exponential functions; and elementary differential and integral calculus. Designed for MA students who need to improve their background in mathematics. Carries no credit toward the MA or PhD degrees.

ECN 3040 Introduction to Statistics 0 QH

Introduces statistical methods and techniques used in economic analysis. Studies descriptive statistics, time-series and index number problems, sampling problems, probability theory, and hypothesis testing. Designed for MA degree students who need to improve their background in basic statistics. Carries no academic credit toward the MA or PhD programs.

ECN 3110 Introduction to Microeconomic Theory for Master of Science Students 4 QH

Covers basic microeconomic theory, including consumption, production and cost theory, market structure and welfare economics. This course is equivalent to ECN 3010.

ECN 3120 Introduction to Macroeconomic Theory for Master of Science Students 4 QH

Covers basic macroeconomic theory with an emphasis on analytical concepts and tools with some application to macroeconomic problems and public policy. This course is equivalent to ECN 3020.

ECN 3130 Introduction to Mathematics for Economists for Master of Science Students

Seeks to acquaint the student with the algebra and elementary calculus necessary for quantitative economics: simultaneous linear systems; polynomial, logarithmic and exponential functions; and elementary differential and integral calculus. This course is equivalent to ECN 3030.

ECN 3140 Introduction to Statistics for Master of Science Students 4 QH

Introduces statistical methods and techniques used in economic analysis. Topics include descriptive statistics, time-series and index number problems, sampling problems, probability theory, and hypothesis testing. This course is equivalent to ECN 3040.

ECN 3150 Microeconomic Policy Planning Seminar 4 QH

Explores cost efficiency and effectiveness, assessment of externalities, shadow prices, benefit-cost analysis, project implementation and evaluation. Discusses budget analysis, evaluation of public programs, role of private and public sectors, relationship of projects and macro planning, and the use of analysis by policymakers. *Prereq.* ECN 3110, ECN 3140 co-requisite.

ECN 3151 Macroeconomic Policy Planning Seminar

Examines the role of public sector in the economy. Investigates socio-economic objectives and public policies, and national economic planning and synthesis of models for growth and development. Presents the tools and techniques for economic planning, and reviews the construction and utilization of input-output tables. Describes planning and policy implementation and evaluation. *Prereq.* ECN 3120, ECN 3140 co-requisite.

ECN 3152 Workshop in Economic Planning and Policy

Includes empirical work involving micro and macro planning techniques, applying the latter to individual case studies of a specific plan, program, or organization. Students are expected to prepare and present a research paper on a chosen case study, demonstrating the ability to use planning techniques. *Prereq.* ECN 3150 and ECN 3151.

ECN 3210 Microeconomic Theory 1 4 QH

Presents microeconomic theory at the MA level. Investigates equilibrium conditions in consumption and production and the theory of factor markets and efficiency. Various types of market structures are covered with respect to these areas. *Prereq.* ECN 3030 or ECN 3130.

ECN 3220 Macroeconomic Theory 1 4 QH

Examines basic macroeconomic modeling and policy effectiveness. Focuses on theoretical debate on price level and output determination from the monetarist, Keynesian, and rational expectations viewpoints. *Prereq.* ECN 3030 or ECN 3130.

ECN 3230 History of Economic Thought

Discusses the development of economic thought, focusing on the analytical innovations in economic thought, beginning with the physiocrats and extending up to contemporary thinkers. Stresses the persistence of certain topics, like money, capital accumulation, macroeconomic stability and value theory, throughout the development of economic thought and considers the historical policy issues that inspired different thinkers to address these topics in a new way.

ECN 3240 Statistical Inference**4 QH**

Studies statistical methods and techniques. Topics include probability theory and models, testing economic hypotheses, analysis of variance, estimation, non-parametric tests, t-statistics and f-statistics, and correlation analysis. *Prereq. ECN 3040 or ECN 3140 or statistics examination.*

ECN 3241 Econometrics 1**4 QH**

Studies the classical linear model of estimation, testing, and prediction. Explores the implications and solutions of multicollinearity, heteroscedasticity, and autocorrelation. Topics include qualitative variables, discrete dependent variables, dynamic models, simultaneous equation systems, instrumental variables estimation, and model selection. *Prereq. ECN 3030, ECN 3130, and ECN 3240.*

ECN 3310 Case Studies in Applied Microeconomics

Explores applied microeconomics using case studies in organizational decision-making for such problems as short- and long-run forecasting of demand, and short- and long-run cost and production decisions. Other case studies focus on competition and pricing strategies in different markets, financing of investments, and response to government regulations and taxation. *Prereq. ECN 3010 or ECN 3110, ECN 3030 or ECN 3130.*

ECN 3315 Economics of Law and Public Policy

Builds on a knowledge of intermediate microeconomic theory in evaluating the justification for an impact of various bodies of law and public policy. While the particular examples and focuses may vary, the emphasis of the course will be on economic justifications for government intervention; public policy alternatives; and impact evaluation of alternative government policies. Discussions will rely on economic models of behavior and social welfare theory to describe and predict the impact of law/regulation/policy and to evaluate alternative forms of intervention. Topics include the elements of an economic perspective, unregulated market behavior, market failure and public intervention, policy and program evaluation, and the economics of contract and tort law. Limited to Law, Policy, and Society students, with exceptions by permission of the instructor. *Prereq. ECN 3010 or permission of instructor.*

ECN 3330 Economic Programming

Examines economic programming with an emphasis on linear programming, simulation, and queuing theory with computer applications. *Prereq. ECN 3530.*

ECN 3332 Computers in Economic Research

Introduces the use of computers in economic research. Topics include using the Northeastern computer system, descriptive statistics, regression analysis, matrix manipulation, and high-level programming languages. This course will combine classroom lectures with hands-on use of the computer. *Prereq. ECN 3040, ECN 3140, or ECN 3240.*

ECN 3350 Economics of the Labor Market and Labor Force 1

Presents labor force measurement and determinants, participation and composition, and microanalysis of labor supply and demand. Topics also include varieties of labor markets and their functioning, labor allocation and migration, minimum wages, and applications of human capital theory to the labor force. *Prereq. ECN 3010 or ECN 3110.*

ECN 3351 Economics of the Labor Market and Labor Force 2

Studies macro money-wage and employment determination in the short run, the Phillips curve, and macro wage-price problems. Discusses income policies, unemployment and underemployment, technological change, and changing skill requirements. Includes productivity measures, determinants and trends, and secular changes in real wages and employment. *Prereq. ECN 3020 or ECN 3120.*

ECN 3352 Economics of Manpower Planning 1

Examines the role of manpower planning and its integration with general development planning. Analyzes and evaluates different techniques of manpower planning, including technological versus economic methods. Offers practice in manpower forecasting and data problems, and skill training versus educational strategies. Explores models of educational planning and their applications to different countries. *Prereq. ECN 3010 or ECN 3110.*

ECN 3353 Economics of Manpower Planning 2

Presents applications of manpower planning methods and techniques to problems of national economic development. Considers cost-benefit and cost-effectiveness of educational and manpower programs. Focuses on the special problems of health manpower, scientists, engineers, and technicians. Evaluates methods and predictions used in national manpower plans. *Prereq. ECN 3352.*

ECN 3354 Economics of Medical Care

Discusses the organization of medical care, the problems associated with various alternative delivery systems, and the utilization and availability of physicians and other paramedical personnel. Examines the growth and pressures exerted by third-party payers; and consideration of federal, state, and municipal participation in the delivery of quality medical care under various alternatives for national health insurance.

ECN 3355 Economics of Human Capital

Examines the investments in human capital as applied to education, training, health, migration, family formation, and fertility. Uses empirical studies to illustrate human capital theory and to evaluate its usefulness in both developed and developing econo-

ECN 3356 Local Labor Markets: Research Methods, Problems, and Planning

Studies analytical frameworks and empirical measures for determining the nature and operation of state and local labor markets. Analyzes techniques for planning human resource programs at state and local levels. Discusses a variety of local labor markets, the use of data from public agencies to examine such markets, and composition of local labor force. Topics also include sources of local labor supply, industrial and occupational mix, local wage and salary structures, and local income distribution.

ECN 3359 Seminar in Human Resource Development

Presents selected topics on the development and use of human resources. *Prereq.* *Permission of instructor.*

ECN 3360 Regional Economics

Explores determinants of homogeneous regions, including theories of location for firms, industries, and people. Considers regional income accounting systems, and models of intra- and interregional income and output; economic impact analysis. *Prereq.* *ECN 3010 or ECN 3110.*

ECN 3362 Economics of Crime

Discusses the resource allocation problem as it relates to criminal behavior and effective law enforcement. Evaluates costs and benefits of alternative law enforcement policies. Analyzes criminal activity, including organized crime in an economic context.

ECN 3363 Urban Economic Systems

Considers the economy of cities. Analyzes intrametropolitan spatial relationships including industrial location, and models of residential land, and housing markets. *Prereq.* *ECN 3010 or ECN 3110 and ECN 3030 or ECN 3130.*

ECN 3364 Urban Economic Development

Investigates problems in urban economic development. Topics include: dynamic and structural change in urban economics, models and techniques for describing and evaluating urban economies, development strategies and tools, commercial and industrial development, and housing development. *Prereq.* *ECN 3010 or ECN 3110.*

ECN 3366 Economics of Transportation

Provides an application of microeconomic theory to transportation. Topics include: demand and demand estimation, cost and cost estimation, pricing and investment, and regulation and deregulation. Applications cover both urban and intercity passenger transportation as well as freight transportation. *Prereq.* *ECN 3010 or ECN 3110 and ECN 3030 or ECN 3130.*

ECN 3369 Urban/Regional Economics Seminar

Covers selected topics in urban/regional economics. *Prereq.* *ECN 3363 or ECN 3364.*

ECN 3370 Economic Development Theory

Presents alternative approaches to the theory of economic development. Considers theories that address growth, technology, structural change, industrialization, factor proportions and factor prices, trade, popu-

lation, and income distribution. *Prereq.* *ECN 3010 or ECN 3110, ECN 3020 or ECN 3120 or permission of instructor.*

ECN 3371 Regional Development

Examines methodology and applications of input-output techniques for planning and analysis in developing countries. Discusses national and multiregional input-output systems. *Prereq.* *ECN 3332 or permission of instructor.*

ECN 3372 Comparative Economic Development

Explores methods and applications of comparative development study, measures and indicators of development, cross-country data analysis, comparative development systems plans vs. markets, and comparative development strategies. *Prereq.* *ECN 3370 or permission of instructor.*

ECN 3373 Development Finance

Examines sources of investment finance in developing countries; role of taxation and tax structure reform; development of financial institutions and capital markets; private and official finance from abroad and debt-service problems; and problems of monetary management and export instability.

ECN 3374 Comparative Economic and Business Practices in the United States and Abroad

Covers market structure and business organization, ownership, management and control in the United States, OECD, and other developed countries; the influence of multinational enterprises. Studies labor markets and survey and case studies of industrial relations. Traces patterns and impact of government policies and national trade and finance patterns, volume, and practices.

ECN 3375 International Trade and Finance

Focuses on classical and neoclassical theories of international trade, balance of payments, exchange rate determinants, analysis of trade distortions, international financial markets, the international monetary system, and issues in international trade and finance. *Prereq.* *ECN 3010 or ECN 3110 and ECN 3020 or ECN 3120.*

ECN 3379 Development Planning Seminar

Analyzes political and economic plans. Surveys neoclassical growth economies, and input-output techniques in open and closed models. Covers elements of linear programming; optimal decision techniques; processes of implementation of planning; interaction of public and private sectors; and guide to empirical applications. *Prereq.* *ECN 3020 or ECN 3120 or ECN 3220 and ECN 3370 or permission of instructor.*

ECN 3380 Monetary Theory

Studies the relationships between money and economic activity emphasizing various quantity theory models and theories of the demand for money and velocity. *Prereq.* *ECN 3020 or ECN 3120.*

ECN 3381 Monetary Policy

Analyzes monetary policy in the United States. Studies Federal Reserve objectives, policy instruments and techniques and their relationship to aggregate eco-

economic activity and financial markets. Introduces recent developments and issues. *Prereq.* ECN 3380.

ECN 3384 Capital Markets

Covers primary sources of savings and demand for financial assets; role of financial intermediaries; banking system; and government lending agencies. Explores demand for funds and real investment—mortgage, corporate, and government securities markets; interdependence of rate structures; and flow-of-funds data in relation to national income accounts.

ECN 3389 Seminar in Money and Finance

Selected topics in money, credit and banking. Students will write research papers. *Prereq.* Permission of instructor.

ECN 3390 Public Finance Theory 1: Public Expenditures

Surveys fiscal functions and institutions of government; public choice and fiscal politics; theory of public goods; public expenditure analysis and evaluation; and fiscal federalism and relationships among governments at different levels, including intergovernmental grants. *Prereq.* ECN 3010 or ECN 3110 and ECN 3030 or ECN 3130.

ECN 3391 Public Finance Theory 2: Taxation

Focuses on fiscal functions of government; principles of taxation; problems of tax structure and reform at the national and local levels; tax incidence and equity; effects of taxation on economic efficiency and growth; and issues of public debt and the deficit. *Prereq.* ECN 3010 or ECN 3110.

ECN 3392 Public Policy and Finance

Studies techniques of fiscal policy, fiscal policy norms, and public sector debt; tax policy and federal tax reform; the conflict between social implications of price stabilization and full employment; public expenditure policy; and the interrelation between monetary and fiscal controls. *Prereq.* ECN 3020 or ECN 3120.

ECN 3399 Seminar in Public Finance

Presents selected topics in public finance. *Prereq.* ECN 3390 and ECN 3391 or permission of instructor.

ECN 3510 Microeconomic Theory 2 4 QH

Examines advanced topics in microeconomics related to consumption, production, and market imperfections. Analyzes theory of general equilibrium, welfare economics, second best, externalities, and public goods. *Prereq.* ECN 3210 or equiv.

ECN 3520 Macroeconomic Theory 2 4 QH

Studies theory and problems of macro-dynamics, growth, inflation, cycles, and stabilization policy. *Prereq.* ECN 3220 or equiv.

ECN 3530 Mathematics for Economics 4 QH

Applies matrix algebra and simple multivariate calculus to economic analysis. Discusses static optimization and dynamic analysis; difference and differential equations. Uses examples from economic theory. *Prereq.* ECN 3030 or ECN 3130 or mathematics examination.

ECN 3540 Econometrics 2 4 QH

Examines asymptotic and small sample properties of various estimators; rank-order conditions for identification;

specification error and error in variables; remedies for autocorrelation and multicollinearity; dummy variables; distributed lags; forecasting and simulation; non-linear estimation; and alternative estimation technique. *Prereq.* ECN 3241.

ECN 3601 Doctoral Research Seminar 1 4 QH

The PhD seminars are taken after all required PhD courses have been completed. *Prereq.* ECN 3510, ECN 3520, ECN 3530, ECN 3540 (the PhD core), and 12 QH of graduate coursework in the student's field of concentration, or by written permission of instructor.

ECN 3602 Doctoral Research Seminar 2 4 QH

Prereq. ECN 3601.

ECN 3798 Master's Thesis Continuation 0 QH

ECN 3799 Doctoral Dissertation Continuation 0 QH

ECN 3850 Internship in Economics 1 QH

Comprises academic credit for internship work in economics. For MA or MS students only. *Prereq.* Permission of instructor and approval of graduate director.

ECN 3851 Internship in Economics 2 QH

Comprises academic credit for internship work in economics. For MA or MS students only. *Prereq.* Permission of instructor and approval of graduate director.

ECN 3852 Internship in Economics 3 QH

Comprises academic credit for internship work in economics. For MA or MS students only. *Prereq.* Permission of instructor and approval of graduate director.

ECN 3855 Internship in Economics 1 QH

Comprises academic credit for internship work in economics. For PhD students only. *Prereq.* Permission of instructor and approval of graduate director.

ECN 3856 Internship in Economics 2 QH

Same as ECN 3855.

ECN 3857 Internship in Economics 3 QH

Same as ECN 3855.

ECN 3870 Readings in Economics 1 QH

Offers supervised reading in selected topics in economics. For MA or MS students only. *Prereq.* Permission of instructor and approval of graduate director.

ECN 3871 Readings in Economics 2 QH

Offers supervised reading in selected topics in economics. For MA or MS students only. *Prereq.* Permission of instructor and approval of graduate director.

ECN 3872 Readings in Economics 3 QH

Offers supervised reading in selected topics in economics. For MA or MS students only. *Prereq.* Permission of instructor and approval of graduate director.

ECN 3873 Readings in Economics 4 QH

Offers supervised reading in selected topics in economics. For MA or MS students only. *Prereq.* Permission of instructor and approval of graduate director.

- ECN 3874 Readings in Economics** 5 QH
Offers supervised reading in selected topics in economics. *For MA or MS students only. Prereq. Permission of instructor and approval of graduate director.*
- ECN 3875 Readings in Economics** 6 QH
Offers supervised reading in selected topics in economics. *For MA or MS students only. Prereq. Permission of instructor and approval of graduate director.*
- ECN 3880 Readings in Economics** 1 QH
Offers supervised reading in selected topics in economics. *For PhD students only. Prereq. Permission of instructor and approval of graduate director.*
- ECN 3881 Readings in Economics** 2 QH
Offers supervised reading in selected topics in economics. *For PhD students only. Prereq. Permission of instructor and approval of graduate director.*
- ECN 3882 Readings in Economics** 3 QH
Offers supervised reading in selected topics in economics. *For PhD students only. Prereq. Permission of instructor and approval of graduate director.*

- ECN 3883 Readings in Economics** 4 QH
Offers supervised reading in selected topics in economics. *For PhD students only. Prereq. Permission of instructor and approval of graduate director.*
- ECN 3884 Readings in Economics** 5 QH
Offers supervised reading in selected topics in economics. *For PhD students only. Prereq. Permission of instructor and approval of graduate director.*
- ECN 3885 Readings in Economics** 6 QH
Offers supervised reading in selected topics in economics. *For PhD students only. Prereq. Permission of instructor and approval of graduate director.*
- ECN 3890 Master's Thesis** 6 QH
Provides thesis supervision by members of the department. *Prereq. Approval of graduate director.*
- ECN 3899 Doctoral Dissertation** 0 QH
Prereq. Approval of graduate director.

English

Students in graduate programs other than English and Curriculum and Instruction may register for English department courses only in the first week of classes and only with the permission of the instructor.

All courses carry three quarter-hours of credit unless otherwise specified.

- ENG 3300 Introduction to Critical Issues**
Presents approaches to the study of literature considering both traditional and contemporary views.
- ENG 3302 Bibliography and Research Methods**
Investigates the methods of finding information in the study of literature and language. Explores primary bibliography, secondary bibliography, and textual and critical bibliography. Examines how to research, write, and document papers for graduate seminars, how to research and write theses and dissertations, and how to publish articles and books. This course is strongly recommended for all students who plan to study for a PhD in English.

American Literature

- ENG 3324 Perspectives on American Literature**
Attempts to discover common themes and recurrent patterns in American literature through a close reading of critics as various in their approaches as Lawrence, Parrington, Chase, Pearce, and Fiedler.
- ENG 3325 Topics in Early American Literature**
Focuses on the work of one writer, a group of writers, or a theme or structure common to several writers—Jonathan Edwards, women writers, the poets of the seventeenth and eighteenth centuries, oryology, for example—in the first two hundred years of American literature. Topics change with time and demand.

ENG 3326 Topics in Twentieth-Century American Literature
Explores twentieth-century American literature on a thematic, formal, generic, cultural, or interdisciplinary basis. May include topics such as: heroes and antiheroes in modern American fiction, twentieth-century American nature poetry, action painting and the New York School, women in twentieth-century American literature, surrealism in modern and contemporary American poetry, the city in twentieth-century American literature, and naturalism in the modern American novel.

ENG 3327 Major American Novelist
Examines in detail the work of a major American novelist and its historical context and cultural milieu—the work, for example, of Herman Melville, Mark Twain, Henry James, Willa Cather, Ernest Hemingway, or Saul Bellow.

ENG 3328 Major American Playwright
Examines in detail the work of a major American playwright and its theatrical style and social impact—the work, for example, of Eugene O'Neill, Tennessee Williams, Arthur Miller, or Edward Albee.

ENG 3329 Major American Poet
Considers in depth the work of a single major figure. Some likely subjects are Whitman, Dickinson, Frost, Eliot, Pound, Williams, Stevens, and Lowell.

ENG 3330 American Drama
Surveys American drama from its political beginnings in the eighteenth century to the experimental variety

of the twentieth, from Royall Tyler and William Dunlap to Eugene O'Neill and Imamu Amiri Baraka.

ENG 3331 Topics in American Literature

Presents American literature on a thematic, formal, generic, cultural, or interdisciplinary basis. May include: the *Isolato* in American literature, typology and American art, written women and women writers, realism in American literature, Southern literature, humor in American literature, the frontier in American writing, local colorists, and "The Machine in the Garden."

ENG 3583 Early American Literature

Surveys American literature during its first two centuries, from the Puritans to the Knickerbockers, from William Bradford to James Fenimore Cooper.

ENG 3585 Topics in Nineteenth-Century American Literature

Topic to be announced. Recent examples include Transcendentalism, the literature of the Civil War, and the literature of social reform.

ENG 3586 Nineteenth-Century American Prose, 1820-1865

Focuses on the characteristics of the Romantic movement and New England Transcendentalism as we find them in the works of the principal prose writers of the period. Determines the particular themes and techniques of such writers as Poe, Hawthorne, Melville, Emerson, and Thoreau by close readings of their texts.

ENG 3587 Nineteenth-Century American Poetry

Topic to be announced.

ENG 3589 Nineteenth-Century American Prose, 1865-1900

Covers the post-Civil War novel in America, including the realistic and naturalistic movements, and such authors as Twain, Howells, and Henry James. Includes some notable nonfiction writers, such as Henry Adams and William James.

ENG 3592 Modern American Drama

Analyzes philosophic and aesthetic trends among such playwrights as O'Neill, Williams, Miller, Albee, Simon, and others.

ENG 3593 Individual Modern American Poet

Topic to be announced.

ENG 3594 Contemporary American Prose

Concentrates on the novel in exploring developments in American prose since 1945. Considers Mailer, Bellow, Malamud, Barth, Heller, Walker, Pynchon, Vonnegut, and Hawkes.

ENG 3595 Individual Modern American Novelist

Examines in depth the work of a major figure in American fiction, focusing on the cultural context out of which he or she emerges. Recent selections for this course have been Hemingway, Fitzgerald, Mailer, Faulkner, and Bellow.

ENG 3596 Individual American Writer

Topic to be announced.

ENG 3598 Modern American Prose

Includes close examination of such prose forms as the essay, short story, autobiography, biography, history, and novel. May select writers with some special

purpose in view, but those generally representative of the 1912-1950 period.

ENG 3610 Contemporary American Fiction

Surveys major developments in American fiction of the period from roughly 1945 to the present against the cultural background of that period. Considers such categories as Southern fiction, Jewish fiction, black fiction, women's fiction, and such writers as Mailer, Kerouac, Welty, Malamud, and Didion.

British Literature

ENG 3416 Twentieth-Century British Drama

Explores the evolution of British drama from Shaw to Tom Stoppard, giving particular attention to the influence of Ibsen and later European dramatists; the Irish influence of Yeats, Synge, and O'Casey; the traumas of two world wars; and the steady growth in the variety and power of British dramatic productions. Also studies Arthur Wing Pinero, John Galsworthy, D. H. Lawrence, Samuel Beckett, James Osbourne, Terrence Rattigan, and Harold Pinter.

ENG 3548 Topics in Renaissance Literature

Considers specific topics in the literature of the sixteenth century, such as the sonnet sequence, and fictional and nonfictional prose.

ENG 3549 Topics in Seventeenth-Century Literature

Considers specific topics in literature from 1600 to approximately 1660, such as metaphysical poetry, religious poetry and prose, and drama.

ENG 3551 Chaucer

Examines in detail selected works by Chaucer.

ENG 3553 Medieval Literature

Examines in detail major works of medieval literature.

ENG 3554 Topics in Medieval Literature

Topic to be announced.

ENG 3555 Renaissance Literature

Studies non-dramatic works by such authors as Wyatt and Surrey, Sidney, Marlow, Spenser, and Shakespeare.

ENG 3558 Shakespeare's Tragedies

Studies Shakespeare's major tragedies.

ENG 3559 Shakespeare's Comedies

Studies Shakespeare's major comedies.

ENG 3560 Topics in Shakespeare

Topic to be announced.

ENG 3561 Seventeenth-Century Literature

Covers major prose and poetry of the seventeenth century, excluding drama: Bacon, Hobbes, Browne, Bunyan, Donne, Herbert, Johnson, Marvell, and others.

ENG 3562 Milton

Presents Milton's poetic and intellectual achievement through analysis of his major works. Emphasizes *Paradise Lost* as an expression of Renaissance humanism and the culmination to the epic tradition.

ENG 3563 Restoration and Early Eighteenth-Century Literature

Critically studies neoclassical drama, poetry, and criticism, including Restoration drama, Dryden, Pope, Addison, Steele, and Gay.

ENG 3564 Later Eighteenth-Century Literature

Considers Johnson, Boswell, and the Club: Burke, Goldsmith, and Gibbon. Includes poetry of Cowper, Gray, Burns, and Smart.

ENG 3565 Topics in Eighteenth-Century Literature

Topic to be announced.

ENG 3566 Eighteenth-Century Novel

Focuses on novels by Defoe, Fielding, Richardson, Smollett, Sterne, and Austen.

ENG 3568 Romantic Poetry

Surveys representative forms and works of the major poets of the English Romantic Period (1798-1832): Blake, Wordsworth, Coleridge, Byron, Shelley, and Keats. Studies the poetry in the historical and intellectual context of its time.

ENG 3569 Romantic Literature

Surveys representative forms and work of English Romantic prose—both fiction and nonfiction. Draws examples from the fiction of Austen, Hogg, Scott, and the Gothic novelists, as well as from the nonfiction prose of Coleridge, De Quincey, Hazlitt, Lamb, and Shelley. May use other texts as needed to illustrate or amplify the ideas expressed in the prose.

ENG 3570 Topics in Romanticism

Explores Romantic attitudes toward mankind in relation to self, society, and the universe, and Romantic attitudes toward the individual person as poet, with the impact these attitudes have upon the form and thematic substance of authentic and fictional autobiography in poetry and prose. May include an intensive reading of one major British writer whose attitudes, themes, style, and philosophy are representative of the Romantic Era (1798-1832).

ENG 3571 Victorian Literature

Surveys major genres in Victorian literature with emphasis on the transition from the Victorian to the "modern," including such writers as Carlyle, Ruskin, Arnold, Swinburne, Pater, and Wilde.

ENG 3572 Victorian Poetry

Focuses on Tennyson, Browning, Arnold, the pre-Raphaelite circle, and the movement toward modernism: D. G. Rossetti, Swinburne, G. M. Hopkins.

ENG 3573 Victorian Novel

Closely studies major works by such writers as Dickens, Eliot, the Brontës, and Hardy.

ENG 3575 Topics in Victorian Literature

Topic to be announced.

ENG 3580 Twentieth-Century British Fiction

Examines major figures of the modern and the contemporary periods: Conrad, Joyce, Cary, Beckett, Braine, Fowles, Snow, Lawrence, Woolf, Murdoch, Lessing and Huxley.

ENG 3582 Topics in Irish Literature

Examines such topics as the Irish Renaissance, Irish short fiction, and the Irish novel.

ENG 3628 Topics in Twentieth-Century British Literature

Explores various topics in twentieth-century British literature.

Creative Writing**ENG 3347 Creative Writing Workshop**

Comprises advanced work in creative writing. *Prereq.* ENG 3350, ENG 3351 or permission of instructor.

ENG 3350 Creative Writing 1

Focuses on prose fiction.

ENG 3351 Creative Writing 2

Focuses on poetry.

ENG 3605 Independent Study in Creative Writing

By arrangement.

ENG 3606 Creative Writing Thesis

6 QH

By arrangement.

Criticism**ENG 3315 Contemporary Critical Theory**

Introduces the study of modern and contemporary literary theory and criticism, including "New Critical," Marxist, feminist, psychoanalytic, structuralist, poststructuralist, phenomenological, and other approaches.

ENG 3317 Topics in Criticism

Examines such topics in critical theory as narrative, cultural criticism, representation, reader response, and feminist theory.

ENG 3320 History of Criticism

Studies the history of literary criticism from Aristotle to the present including such writers as Aristotle, Plato, Sidney, Johnson, Wordsworth, Shelley, and Pater.

Film Studies**ENG 3612 Film Studies**

Introduces the basic methods of film analysis, the history of cinema, and recent theoretical debates within film studies. Provides familiarity with ways of analyzing films in terms of editing, shot composition, framing, mise-en-scene, and the like, with the historical changes in Hollywood and in international cinema, and with such current theories as structuralism and semiotics.

ENG 3613 Topics in Film

Focuses on some specific dimension of film studies—a genre of film such as film noir, a director like Alfred Hitchcock or Francis Ford Coppola, a film movement like Expressionism or social realism, or a particular historical moment in film history such as post-1967 Hollywood. Topics chosen determine texts and films.

Independent Studies

ENG 3601 Thesis

6 QH

ENG 3602 Independent Study

By arrangement.

ENG 3603 Independent Study Certificate of Advanced Graduate Study

By arrangement. *Limited to students in the Certificate of Advanced Graduate Study Program.*

Linguistics

ENG 3321 Linguistics and Literature

Introduces stylistics, the study of formal properties of poetry and prose. Considers general questions: Are there constraints on creativity? What relationship holds between form and meaning? What is the nature of metaphor? How can we characterize author style, genre style? Analyzes texts of representative major writers for linguistic features. Focuses on how linguistic methods can contribute to critical response.

ENG 3322 Linguistics and Writing

Explores topics in textuality and text cohesion, distinguishing unified text from a string of unrelated sentences. Studies lexical, semantic, and syntactic cohesion, paragraph patterning, and information flow. Analyzes diverse non-fictional prose selections for discourse style features. Considers expressive, persuasive, and reference discourse (scientific, informative, and exploratory modes).

ENG 3400 Issues in English Grammar

Explores the nature and rules of grammar. Examines and enlightens concepts and definitions in traditional grammar using tools from contemporary linguistic theory. Contrasts the role of rules as prescriptive conventions or descriptive devices. Considers how sentence structure contributes to meaning in language. Examines the relationship between grammar and dialect, question of standard and nonstandard English, and notions of linguistic competence and linguistic performance.

ENG 3401 Introduction to Semantics

Examines how language constructs meaning. Explores various linguistic levels where meaning resides: word, sentence, intonation, stress, and discourse. Considers non-linguistic factors affecting meaning: context, pragmatic knowledge, and the rules of logic. Investigates such questions as: What are the minimal units of meaning? What elements go into determining meanings? Are there any meaning universals? Are meanings fixed?

ENG 3402 History of English Language

Traces the development of English using linguistic readings and historical documents (letters, journals, literary selections) from various periods and representing a range of styles (formal to informal). Studies changes in the sound system, inflectional system,

vocabulary, and syntax of English, as well as the development of prose style. Considers issues in language change: the influence of foreign invasion, relocation, dialect dominance, and literacy; and specific events such as the Norman invasion and the settlement of America.

ENG 3403 Topics in Linguistics

Explores such issues in linguistics as the lexicon; dialect; metaphor; language and gender; and language and social structure.

ENG 3404 Introduction to Linguistics

Poses the question "What is language?" and takes both an internal and external approach to an answering. Examines the internal organization of linguistic units (phonemes, morphemes, phrases, sentences) in languages as diverse as Arabic, Breton, Xhosa, and Zuni. Discusses how language is learned and used, exploring biological, computational, philosophical, and social facets. Introduces a linguistic perspective on topics of language controversy, including literacy, sexism, language change, and the "innateness question."

ENG 3406 Introduction to Syntax

Explores aspects of language structure through the framework of contemporary syntactic theory. Offers a technical but introductory exploration of the form, function, and relationships of words, phrases, clauses, and sentences. Introduces tools of linguistic analysis and a methodology for examining our internalized knowledge of English sentence composition. Considers language from the perspective of learnability and universal grammar.

Literary Studies

ENG 3358 Topics in Nonfiction Prose

Examines writings in nonfiction prose in such areas as biography, history, science, and technology. Varies according to the design of the instructor.

ENG 3361 Topics in Literary Study

Focuses on literature on a thematic, formal, or generic basis. May include: black women writers, poetry of nature.

ENG 3419 Topics in Genre

Examines such topics in genre criticism as biography, autobiography, satire, and children's literature.

ENG 3420 Contemporary Poetry

Surveys technical and thematic developments of contemporary (including postmodern) American and British poetry. Considers such writers as Bishop, Lowell, Larking, Jennings, Hughes, Heavey, Ashbery, Bronk, Ginsberg, Plath, Rich, Baraka, O'Hara, Tomlinson, Hill, Bly, Merwin, and Merrill. Considers also more "current" writers such as Palmer, Schnackenberg, and Hass, as well as such groups as the L=A=N=G=U=A=G=E poets, and such practices as performance poetry and field composition.

ENG 3421 Modern Poetry

Surveys technical and thematic developments of modern American and British poetry. Considers such writers as Yeats, Frost, Stevens, Eliot, Pound, H. D.,

Sitwell, Moore, Williams, and Auden. Considers also such issues as canon formation and such "movements" as the Harlem Renaissance, as well as the intersections of modernism and postmodernism.

ENG 3622 Topics in Drama

Examines such subjects as tragic drama, comic drama, and absurdist drama.

ENG 3623 Topics in Poetry

Examines such subjects as epic poetry, the lyric poetry of the seasons, and confessional poetry.

ENG 3624 Topics in Fiction

Examines such subjects as short fiction, the romance, and the short-story cycle.

ENG 3625 Topics in Literary Relations

Explores relations among national literatures. Covers such subjects as Modernism in England and America, and Romanticism in nineteenth-century England and America.

ENG 3626 Topics in Literature and Other Disciplines

Examines such subjects as literature and the visual arts, literature and psychology, and literary impressionism.

ENG 3627 Topics in Comparative Literature

Examines such subjects as classical backgrounds, nineteenth-century European novel, and post-Modernist fiction.

Technical Writing

ENG 3348 Materials and Methods for Technical Writing

Allows students to research a variety of topics that are germane to teaching, corporate training, and improving one's own technical writing skills. Explores sources of information available to scientific and technical communications, including on-line databases, conventional printed sources, and personnel. *Students should plan to take this course early in their graduate studies.*

ENG 3349 Workshop in Writing for Publication

Examines published articles in scientific, technical, and professional journals and magazines, articles that will be evaluated for content, style, tone, format, and mechanical details. Analyzes the articles success, its professionalism, its appropriateness and timeliness, and the professional standards of the journal. Provides for students to research, write, and revise an article for submission to a professional journal of their choice, and for the class to review and edit these articles before submission. Aims at having an article accepted for publication.

ENG 3352 Writing for the Professions

Offers an intensive seminar to professionals who need to compose effective letters, memos, proposals, and reports. Focuses on practical approaches to clear, concise writing in fields such as business, marketing, and medicine. Emphasis varies each quarter.

ENG 3354 Technical Writing

Concentrates on communicating scientific and technical information to a variety of audiences. Provides practice in the different aspects of the technical process: analyzing the project, gathering information, organizing, designing layout and graphics, writing, revising, and using feedback. Offers opportunities to write several forms of technical communication: proposals, memos, short pieces, and oral presentations, as well as a long technical report. *This introductory level course is a recommended prerequisite for all other courses. Limited to students in the Master of Technical and Professional Writing Program.*

ENG 3355 Topics in Technical Writing

Focuses on specialized topics in professional communication, such as electronic documentation, proposals, and medical writing. Topic varies each quarter.

ENG 3356 Technical Writing Theory and Practice

Examines systematically various theoretical approaches to technical writing as discourse and discipline. Differentiates the aesthetics of technical writing from other forms of discourse through critical analysis of professional writing strategies, based on current theory and research. Allows students to put theory into practice by writing a technical document and a document exploring theoretical issues.

ENG 3365 Professional Presentations

Provides technical and professional writing students with the ability and understanding to make effective professional presentations. Surveys oral communication skills and compares them with written communication skills. Evaluates other types of presentations for their usefulness in technical communication.

ENG 3366 Ethics of Technical and Professional Communication

Explores various philosophical and ethical issues inherent in the practice of technical communication. Takes the position that writing is a political act and considers the questions of ethics and values likely to arise for technical communicators in the course of their work. Expects readings to lay an interdisciplinary foundation for exploring these questions, drawing on the principles of philosophy, semantics, rhetoric, pragmatics, and psychology. Aims to prepare students for long-term careers as humanists in a technological environment.

ENG 3367 Publications Management

Introduces students to the principles of publications management, covering the five topics of design, writing, editing, production, and evaluation. Covers the techniques as well as the principles of publication, design, and production, with emphasis on current technologies used to prepare in-house documents. Emphasizes the problem of matching form and style to audience. Includes a site visit to observe a large in-house production facility. Anticipates students collaboration in small groups to plan, write, and produce a major document.

ENG 3368 Writing for the Computer Industry

Provides the opportunity to write and edit professional-quality computer documentation. Begins with basic instruction sets, increases in difficulty, and prepares students to write a user's guide as a major project for the quarter. Includes a more abstract paper examining trends within the computer industry. Focuses on techniques for creating *readable* documentation, including attention to formatting, graphic design, and text organization. No exams.

ENG 3369 Graphic Design for Technical Writers 1

Introduces the fundamentals of graphic design communication. Covers the basics of typography, illustration, photography, color, and layout techniques through lectures, presentations, class discussions, and assignments/critiques. Presents an overview of the creative and production processes as well as an explanation of the basic tools and terminology needed to effectively communicate with print design and production professionals.

ENG 3370 Technical and Scientific Editing

Explores the fundamentals of editing as they apply to science, technical, and engineering writing. Covers the role of the editor in business, industry, and the sciences; basic editorial services such as copy and content editing, production editing, and project editing; the editor as writer and interviewer; and science interpretation and technical translation.

ENG 3371 Pascal for Technical Writers

Introduces Pascal, emphasizing writing structured programs using loops, decision statements, procedures, and functions. Data types include integer, real, char, boolean, and one- and two-dimensional arrays.

ENG 3372 Graphic Design for Technical Writers 2

Considers the specifics of project management and working with design and production professionals in a non-studio course. Includes an analysis of the roles and responsibilities of writers, editors, designers, illustrators, photographers, production artists, typesetters, printers, and other professionals involved in book design and production. Covers budget considerations, scheduling, and manufacturing processes related to publishing. *Prereq.* ENG 3369 or permission of instructor.

ENG 3604 Independent Project, Technical, and Professional Writing

Provides for preparation of portfolio of technical and professional writing done for final project. *Limited to students to Master of Technical and Professional Writing Program.*

ENG 3621 "C" Programming for Technical Writers

Teaches the basic concepts of "C" to students in the Master of Technical and Professional Writing Program. Covers use of the vi editor, data types, assignment statements, looping, conditional statements, functions, arrays, structures, pointers, and operations on bite.

Technical Writing Training Program**ENG 3614 Principles of Technical Writing**

Introduces the student in the Technical Writing Training Program to the fundamental concepts and principles of technical writing. Includes the definition of technical writing, audience analysis, organization, clarity, and definitional techniques. Provides practice editing and revising existing documentation. Integrates discussion and sound writing techniques with practice in writing original documentation. *Limited to students in the Technical Writing Training Program.*

ENG 3615 Writing for Computer-Related Industries

Focuses on document preparation and production and on the job environment. Teaches how a documentation department is structured, the phases a document passes through, and how to deal with other departments such as research and development or marketing. Discusses such topics as communication skills, what to expect from other writers and managers, and how to excel within a high tech environment. *Limited to students in the Technical Writing Training Program.*

ENG 3616 Applied Software Writing

Introduces a range of advanced concepts and processes relating to technical documentation. May include text processing, on-line help, preparing indices and cross-references, and documentation bases. *Limited to students in the Technical Writing Training Program.*

ENG 3617 Computer Hardware and Organization

Introduces students in the Technical Writing Training Program to computer hardware components and how they are organized into a computer system, the components of which include disks, magnetic tapes, printers, the CPU, and memory. Teaches data representation, acquaintance with assembly language, and how a computer stores, addresses, and executes instructions. Explains files, including records, fields, and indexed files. Introduces elementary data structures. *Limited to students in the Technical Writing Training Program.*

ENG 3618 Programming in "C"

Teaches structured programming using "C". Stresses correctness, clarity, and reliability of programs. Offers individual guidance in writing programs and access to Northeastern's computer systems for running programs. *Limited to students in the Technical Writing Training Program.*

ENG 3619 Operating Systems and Database Management Systems

Examines components of an operating system and methods of data storage and retrieval. Offers familiarity with copiers, links, the supervisor, and database management systems. *Limited to students in the Technical Writing Training Program.*

Writing**ENG 3309 Writing and Learning Across the Curriculum**

Explores in depth how writing may be used to promote thinking and learning across a wide variety of disci-

plines. Intended primarily for high school and college instructors in the humanities, social sciences, and natural sciences. *Usually given only through the Martha's Vineyard Institute on Writing.*

ENG 3310 Writing Programs in Schools and Colleges

Examines both the nature of writing programs in schools and colleges and the issues that curricular changes raise for these institutions. Intended for English teachers on all levels who wish to become composition leaders in their schools. Presupposes extensive coursework in composition theory and practice. *Usually given only through the Martha's Vineyard Institute on Writing.*

ENG 3311 English Prose Style

Explores the development of prose style in English (chiefly expository), from the sixteenth century to the present. Most major authors are represented, from Roger Ascham to James Baldwin.

ENG 3312 Composition Studies

Provides an introduction in theories of composition.

ENG 3313 Theory and Teaching of Writing

6 QH

Examines several premises of writing instruction and how they can provide successful classroom practices. Designed for teachers or prospective teachers of writing in college or the public schools. *Usually given only through the Martha's Vineyard Institute on Writing.*

ENG 3314 Writing and Reading: Composing

6 QH

Processes

Offers teachers the opportunity to develop a coherent theory of reading instruction coordinated with their teaching of writing. Restricted to teachers who have previously taken a course in the theory and teaching of writing. *Usually given only through the Martha's Vineyard Institute on Writing.*

ENG 3353 Topics in Writing

Examines various topics in writing and composition.

ENG 3357 Computers and Writing

Explores the two major uses of computers in writing instruction: word processing and computer-assisted instruction. Concentrates on the rudiments of word processing, hands-on experience, classroom exercises, and teaching strategies. Includes demonstrations of prewriting, organizing, and revising software, and strategies for developing CAI in composition, and a brief introduction to a programming language. *Usually given only through the Martha's Vineyard Institute on Writing.*

ENG 3359 Writing Workshop 1

Provides advanced training in varied forms of writing. May include such specialized areas as fiction, poetry, professional writing, and writing for academic administrators. Requires intensive student writing and extensive instructor comment. *Usually given only through the Martha's Vineyard Institute on Writing.*

ENG 3360 Writing Workshop 2

Provides advanced training in varied forms of writing. May include such specialized areas as fiction, poetry, and professional writing for academic administrators.

Requires intensive student writing and extensive instructor comment. *Usually given only through the Martha's Vineyard Institute on Writing.*

ENG 3380 Prose Writing 1

Surveys writing of various types of nonfiction prose, including reviews, reports, biography, commentary, research, personal narrative, travel, and others developed by the participant in consultation with the instructor. Focuses on concepts of content, point of view, organization style, and stages of composition. *Usually given only through the Martha's Vineyard Institute on Writing.*

ENG 3381 Prose Writing 2

Continues ENG 3380. Attempts to reinforce writing theory and practice, to introduce the professional concerns of writers, and to prepare writing for possible publication. Provides for participants to refine techniques of composition and to examine the rhetorical methods of description, narration, exposition, and persuasion. Reviews such writers' markets as newspapers, popular magazines, and scholarly journals. When possible, will feature professional writers as guest speakers. *Usually given only through the Martha's Vineyard Institute on Writing.*

ENG 3382 Responding to Writing

Examines and puts into practical use a variety of methods of analyzing writing. Studies both professional and student writing. Provides the tools for analyzing and improving student writing, assessing the writing of their students, and designing appropriate writing assignments and activities. Provides an opportunity to begin the development of an integrated writing curriculum from the elementary to the college level.

ENG 3383 The Composing Process

Based on the premise that the key to teaching writing is teaching revision strategies. Participants look at the research studies of elementary, secondary, and college students and examine manuscripts of professional writers such as E. B. White. Focuses on both the theory and practice of revising. Covers understanding students' assumptions about the writing/revising process; teaching revision strategies; using student writing to teach revision; responding to student writing within the context of revising; and analyzing personal revision strategies. Explores how participants can use what they know about their own revising strategies to teach revision. *Usually given only through the Martha's Vineyard Institute on Writing.*

ENG 3384 Rhetorical Theory

Traces the history of rhetoric and examines the major contemporary theories in the field. Considers the classical rhetoric of Aristotle, Plato, Cicero, and Quintilian and ends with the modern formulations of rhetoric by I. A. Richards, Philip Wheelwright, Alexander Bain, James Moffett, and James Kinneavy. Examines rhetoric in terms of traditional modes of classifying discourse—description, narration, exposition, and persuasion—as well as modern reclassifications—expressive, referential, literary, and other modes. Re-

views rhetorical strategies for invention in the composing process: Burke's dramatistic method, Rohman's prewriting, and Pike's tagmenics. *Usually given only through the Martha's Vineyard Institute on Writing.*

ENG 3385 Writing about Literature and Other Disciplines

Examines some characteristic student and professional writing in the humanities, sciences, and social sciences. Attempts to help participants see how students can use writing as a way of knowing and learning, not just in the English class but, for example, in the biology, history, or even mathematics class. *Usually given only through the Martha's Vineyard Institute on Writing.*

ENG 3386 Research in Composition

Prepares publication of research by providing a working knowledge of sources, current scholarship, and standards of publication. Acquaints participants with various bibliographies, journals, texts, and monographs that constitute the important documents of the field. Uses these documents to pursue research topics in invention, structure, and form, modes of discourse, the composing process, and pedagogy. *Usually given through the Martha's Vineyard Institute on Writing.*

ENG 3387 Case Study Design

1 QH

Prepares participants for research to be conducted in ENG 3388 during the academic year at the home institution. Examines some published case studies of teaching and writings and explores relevant methods of data analysis, observation techniques, interview and questionnaire construction, sampling procedures, experimental design, and writing protocol analysis. *Usually given only through the Martha's Vineyard Institute on Writing.*

ENG 3388 Fieldwork

4 QH

Allows participants to conduct the independent research planned in ENG 3387. Provides resources available for this research at the home institution, including the participants' individual teaching practices, course or departmental curriculum, the writing of their students and of students in other classes, the practices of other teachers and administrators, as well as published books, reports, and articles on composition. Provides for students to collect, collate, and interpret data according to the guidelines established at the institute and then prepare a project in which they present their findings. *Usually given only through the Martha's Vineyard Institute on Writing.*

ENG 3389 Case Study Analysis

1 QH

Provides for participants who have prepared ENG 3388 projects to present their findings, draw their conclusions, and discuss the implications of their research for further study. Guides participants toward possible publication of their work in relevant composition journals. Concludes the ENG 3387, ENG 3388, and ENG 3389 sequence. *Usually given only through the Martha's Vineyard Institute on Writing.*

ENG 3620 Rhetoric

Introduces students to the ideas and scholarship of the major periods of rhetorical developments and allows students to explore the definition of "rhetoric" in ways most meaningful to individual interests.

History

All courses carry three quarter-hours of credit except seminars, which carry four quarter-hours, and other courses where noted.

HST 3241 Methodology

Explores the objectives, methods, and resources of the historian.

HST 3242 European Historiography

Analyzes the development of historical writing from ancient times to the present.

HST 3243 American Historians

Covers the writing of American history by Americans, from colonial times to the present, with emphasis on changes in both form and substance.

HST 3306 The Renaissance (Group 1)

Discusses European political and cultural life from the thirteenth to the seventeenth centuries, with attention to humanism and to the rebirth of classicism in literature and the arts.

HST 3308 Topics in Early Modern Europe (Group 1)

Examines recent interpretations of and approaches to such topics as the Renaissance and Reformation; the

"crisis" in Europe, 1540-1660; gender roles; the French Revolution; and popular culture. Emphasizes recent monographs and journal literature. Requires student to make oral presentations and write short critical essays.

HST 3322 Socialism and Revolution (Group 1)

Studies the history of socialism and revolution from the early nineteenth-century utopias to the New Left of the 1960s.

HST 3339 The Modernization of Ireland (Group 1)

Analyzes themes in the growth and development of modern Ireland. Examines migration and its effects on a traditional society, the role of religion in the assertion of national independence, and modernization within the British nexus.

HST 3345 Hitler's Germany (Group 1)

Studies the history of the Third Reich, including an in-depth analysis of the process by which the political motives and methods of the Nazis ultimately won the support of the German people.

HST 3380 Seminar in the Renaissance (Group 1)

Offers research and writing concerning the Renaissance.

HST 3381 Seminar in the Reformation (Group 1)

Offers research and writing concerning the Reformation.

HST 3384 Seminar in Twentieth-Century Europe (Group 1)

Studies a selected controversy in contemporary European history.

HST 3385 Seminar in European Social History (Group 1)

Focuses on Britain, France, and Germany in the nineteenth and early twentieth centuries and looks at history "from below." Examines comparative issues in European social history. Includes the nature of social protest, the rise of organized labor, and the impact of war and revolution on the lives of ordinary people.

HST 3389 Seminar in the Modern France (Group 1)

Includes research, writing, and collective analysis of several themes in modern French social history since 1789, including the role of social class in revolutionary protest, industrialization, technology and modernization, the rise of the working class and the development of organized labor, the French peasantry in an industrial society, and the nature of the family and women's roles.

HST 3397 Seminar in Comparative Labor History (Group 1)

Analyzes issues in the history of the European labor movement, focusing on nineteenth- and twentieth-century Britain, France, and Germany. Includes the meaning of the concept of class in labor history; labor movements and politics (working-class conservatism and working-class radicalism); the place of women in the working class and in the labor movement; and worker responses to mechanization, automation, and scientific management in the twentieth century.

HST 3399 Seminar in Approaches to Women's History (Groups 1, 2, or 3)

Focuses on current issues in women's history and the methods historians use to study women's historical roles in the market place, work force, political arena, and domestic scene in Europe, Asia, the United States, and Latin America. Emphasizes the importance of comparative and interdisciplinary approaches to the history of women. Includes lectures and discussions with specialists using various approaches, assigned reading, and an independent project.

HST 3405 Colonial America: The Eighteenth Century (Group 2)

Covers the expansion of the English colonies in the New World, the development of political and social institutions, and the sources of friction with England to 1763.

HST 3410 Topics in American Reform (Group 2)

Studies movements to change aspects of American society.

HST 3413 Topics in the Civil War and Reconstruction (Group 2)

Analyzes key issues surrounding the events leading up to the Civil War, the war itself, and the Reconstruction period.

HST 3421 Political Change in Twentieth-Century America (Group 2)

Analyzes the growth of governmental function and structure, emphasizing the evolution and administration of leading policy concerns of the current century, changes in federalism and intergovernmental relations, and patterns of popular political participation and thinking.

HST 3423 The Age of Roosevelt (Group 2)

Analyzes the foreign and domestic policies and programs of the four Roosevelt administrations, set within the context of the worldwide depression and global war. Emphasizes the range of recent interpretations and analytic methods used in evaluating the place of Roosevelt in American history.

HST 3431 History of American Religion (Group 2)

Provides an overview of American religious culture, focusing on topics that illustrate its diversity and its impact on members and on society at large.

HST 3434 United States Social History in the Twentieth Century (Group 2)

Examines the recent literature on such topics as family, gender, class, migration, ethnicity, race, work, leisure, fertility, health, mortality, deviance, and social policy.

HST 3440 African-American History 1 (Group 2)

Covers the history of African-Americans to 1900, with emphasis on the role of black people in slavery and freedom.

HST 3441 African-American History 2 (Group 2)

Considers African-American history since 1900.

HST 3450 Boston as a City (Group 2)

Examines historic Boston from 1822 to the present. Emphasizes Boston's early growth as a city, the Hub as a center of pre-Civil War reform, the coming of the Irish, Boston as America's Athens, the revolutionary shift from Yankee to Irish political domination, the flamboyant era of James Michael Curley, and the development of the "New Boston."

HST 3480 Seminar in American History (Group 2)

Offers research and writing on selected aspects of American history.

HST 3481 Seminar in Colonial and Revolutionary America (Group 2)

Offers research and writing on selected topics in American history prior to 1789.

HST 3482 Seminar in American Governmental History (Group 2)

Concentrates attention on a particular problem or theme in American governmental history, emphasizing individual student research and writing.

HST 3485 Seminar in African-American History (Group 2)

Offers research and writing on an aspect of African-American history.

HST 3486 Seminar in Recent American History (Group 2)

Studies special topics from the period 1896 to the present in detail. Requires presenting a research paper on a major person, action, or movement.

HST 3501 History of Exploration (Group 3)

Surveys comprehensively exploration from ancient times to the present with emphasis on the motives for exploration and their impact on the regions discovered and on those doing the discovering.

HST 3508 Modern Africa (Group 3)

Offers a topical approach to the history of Africa since 1850.

HST 3509 Pan-Africanism (Group 3)

Explores black political thought in Africa and the Americas during the nineteenth and twentieth centuries in the context of modern nationalism and capitalism.

HST 3510 History of the Islamic Peoples (Group 3)

Studies the history, culture, and religion of the followers of Muhammad from 600 to 1800.

HST 3512 Modern Middle East (Group 3)

Studies the Middle East in the twentieth century.

HST 3523 Modern Japan (Group 3)

Discusses the history of Japan since the fall of the Tokugawa, emphasizing political and economic developments, especially after World War II.

HST 3529 Communism in China (Group 3)

Studies the Chinese Communist movement from its origins in the 1920s to the present.

HST 3531 Population in History (Group 3)

Applies demographic theory to history.

HST 3540 Economic History of the Modern Western World (Group 3)

Analyzes the economic development of the modern Western world.

HST 3600 Introduction to Public History (Group 3)

Surveys career options for historians working outside the academy. Examines the educational, ethical, and legal issues involved in historic preservation, archive and museum management, public policy planning and analysis, cultural resource management, and private sector application of the historian's craft.

HST 3601 Historical Administration (Group 3)

Considers the administration of historical agencies with attention to problems of finance and personnel and to the legal-governmental environment in which agencies operate.

HST 3602 Historical Societies and Archives (Group 3)

Analyzes the varieties of historical societies (local, state, and national) and the kinds of private (business, college, and church) and public (local, state, and national) archives; their activities and procedures; and their similarities and differences.

HST 3603 Historical Exhibits and Museums (Group 3)

Studies approaches, techniques, and special problems in the presentation of history to the public through exhibits, films, and other audiovisual and written media. Presents guest lecturers from the field and gives students the opportunity to gain practical experience.

HST 3605 Historical Editing (Group 3)

Presents a laboratory for the study and practice of historical editing. Introduces the major collections of edited papers and instructs students in editing historical documents. Gives each student a historical document to prepare for publication. Also covers the editing of history books and journals.

HST 3607 Historical Consulting (Group 3)

Surveys the professional and business skills necessary to work as an independent historical consultant or to start and successfully operate a consulting firm. Topics include identifying fields and clients, marketing, service development, computer management, ethics, and confidentiality.

HST 3610 Industrial Archeology (Group 3)

Introduces the history, practice, and place of industrial archeology. Plans examination of techniques and procedures used to unearth the industrial past and field trips to local industrial sites.

HST 3611 Historic Preservation (Group 3)

Introduces historic preservation, with attention to the history, the philosophy, and the practical problems of preservation.

HST 3612 Studies in Material Culture (Group 3)

Investigates strategies for examining material culture, including architecture, historic archeological remains, and the artifacts of domestic and work lives, as sources for historical study.

HST 3620 Oral History (Group 3)

Discusses the theory and practice of creating, processing, and using primary source material obtained by taping interviews with people whose role in history would otherwise go unrecorded.

HST 3621 Genealogical Research: Methods and Uses (Group 3)

Analyzes the tools and sources available to genealogists and historians with attention to historical applications of such data. Gives students the opportunity to use various records essential to the writing of family history.

HST 3622 Local History Methodology (Group 3)

Examines the development and uses of local history with special attention to the methodological aspects of this rapidly growing field. Gives students the opportunity to survey resources for a local community, prepare a demographic essay, and examine recent scholarship in local history.

HST 3625 Media and History (Group 3)

Explores such topics as the advantages and drawbacks of specific media, the uses and abuses of media in research and teaching, and the construction of media. Requires each student to participate in a research project involving the creation and/or evaluation of historically valid films, slide tapes, and other materials.

HST 3805 Assigned Reading**1 QH**

Offers assigned reading under supervision of a faculty member.

HST 3806 Assigned Reading**2 QH**

Offers assigned reading under supervision of a faculty member.

HST 3807 Assigned Reading**3 QH**

Offers assigned reading under supervision of a faculty member.

HST 3811 Thesis**3 QH**

Offers thesis supervision by members of the department.

HST 3812 Thesis**3 QH**

Offers thesis supervision by members of the department.

HST 3813 Thesis**3 QH**

Offers thesis supervision by members of the department.

HST 3821 Fieldwork in History 1**4 QH**

Offers students the opportunity to get practical experience in historical agencies (including historical societies, archives, museums, exhibits, restorations, preservation projects, and the like). Requires students to work in the agency eight to ten hours a week for one quarter under the direction of an agency supervisor and departmental adviser.

HST 3822 Fieldwork in History 2**4 QH**

Gives students a second opportunity to acquire practical experience in an historical agency. Requires eight to ten hours a week for one quarter under the direction of an agency supervisor and a departmental adviser.

HST 3823 Fieldwork in History 3**4 QH**

Gives students a third opportunity to acquire practical experience in an historical agency. Requires eight to ten hours a week for one quarter under the direction of an agency supervisor and a departmental adviser.

Journalism (School of)

All courses carry four quarter-hours of credit unless otherwise specified.

JRN 3201 Reporting

Offers extensive practice in researching and writing news and feature stories. Analyzes methods of gathering information from government documents and court records.

JRN 3432 Local Government Reporting

Explores coverage of municipal government, with emphasis on the "beat" approach to reporting public affairs. Emphasizes practical experience in such projects as covering town meetings, board of selectmen, and other commissions and boards.

JRN 3501 History of Journalism

Examines American journalism from European and English roots. Topics include the colonial press, the great personal journalists of the nineteenth century, and the impact of major technological changes in the news media in the twentieth century.

JRN 3508 Law of the Press

Examines libel, invasion of privacy, access to government information, and other legal matters pertinent to the news media.

JRN 3512 Journalism Ethics and Issue

Discusses responsibilities of news media, ethical problems confronting decision makers in various journalism

tic fields, and the principles found in codes of various professional societies.

JRN 3522 Magazine Writing

Covers writing and free-lancing magazine articles, analyzing magazines as markets, and selecting the best feature format—how-to-do-it, profile, personal experience, human interest, interpretive pieces, and others.

JRN 3575 News Media Management

Examines the organizational structure, production methods, and management procedures of news media companies. Explores interaction among various departments of the company and the company's interaction with the market served.

JRN 3617 The Constitution and Mass Communications

Explores freedom of the press through the study and discussion of the First Amendment and other relevant constitutional provisions. Analyzes the impact on the news media of evolving Supreme Court interpretations of the Constitution.

JRN 3677 The News Media Mix and Its Environment

Covers the media mix and issues facing the overall management of the news media, including group ownership, postal regulations, specialization of content, taxation laws, competition, audience definition, and new technologies.

JRN 3678 Applied Leadership Techniques

Focuses on establishing and maintaining internal communications, coaching, developing employees, understanding motivations, solving problems, making decisions, redesigning jobs, and analyzing leadership styles for news media application.

JRN 3679 Research Methods in Journalism

Examines the quantitative and qualitative methods of scientific inquiry as they relate to the journalist as a social scientist. Covers random sampling, content analysis, field experiments, and basic statistics.

JRN 3682 Mass Communication Theories

Examines the major theories regarding the process, nature, and influence of mass communications. Studies communications in a theoretical and research-oriented context.

JRN 3684 Literature of Journalism

Studies numerous authors and observers of the journalism profession via their works to provide a wide-ranging view of journalism, its nature and impact.

JRN 3691 Professional Paper

Analyzes a publication by the case method, using theoretical and practical perspectives. The student's

paper will analyze the publication's weaknesses and strengths and pose possible solutions.

JRN 3870 Graduate Seminar

Examines the mass media as an integral institution in society, focusing on topics of current significance. May be repeated as subject matter changes.

JRN 3890, JRN 3891 Directed Study

Offers students work on individual projects under the supervision of an instructor. May be repeated once.

JRN 3892 Topics

Requires advanced work to develop media skills not covered in other classes. May be repeated as subject matter changes.

JRN 3893, JRN 3894 Thesis

Focuses on preparing a master's thesis under supervision of a faculty committee.

JRN 3895, JRN 3896 Reporting Practicum

Focuses on preparing a series of in-depth stories on a specialized area that will be presented to appropriate media for publication. Provides instructor supervision.

Law, Policy, and Society

Core Courses

ECN 3315 Economics of Law and Public Policy 3 QH

Builds on a knowledge of intermediate microeconomic theory in evaluating the impact of laws and public policies. Relies on economic models of behavior and social welfare for economic analyses of government intervention and public policy programs. Studies unregulated market behavior, market failure and public intervention, policy and program evaluation, and the economics of contract and tort law. *Limited to Law, Policy, and Society students unless students have special permission from the instructor. Prereq. ECN 3010 or permission of instructor.*

INT 3249, INT 3250 Law, Policy, and Society Survey 2 QH

Introduces students to methodologies and perspectives used in several disciplines in studying law and society. Examines such issues as normative versus formative functions of law, social control versus individual freedom, and legal bases of conflict management in society. The course is coordinated by one instructor but lectures are given by a number of faculty members affiliated with the program to provide students with a variety of perspectives.

INT 3255 Interdisciplinary Approaches to the Study of Public Policy 2 QH

Studies different analyses of public policy, including theories of policy generation, formulation, promulgation, implementation, and evaluation.

INT 3650 Seminar in Law, Policy, and Society 1 QH

Explores how to construct and evaluate the design of research. Requires students to make two presentations in the seminar on their dissertation proposal and research design, and their state of the art paper. *Restricted to students in the Law, Policy, and Society Program who have completed all other core courses.*

LAW 2364 Legal Research and Bibliography 1 QH

Introduces students to the resources and the use of the Law Library and the basic techniques of legal research. *Open only to Law, Policy, and Society students.*

SOC 3330 Theoretical Tradition in Law, Policy, and Society 2 QH

Studies different interpretations of how the law works and what its foundations are. Examines the assumptions and the analyses of legal realism, law and economics, Marxism, critical legal studies, functionalism, conflict theory, and natural law. Examines the policy-making implication of each of these schools, each school's program for research, and the social issues each school considers worthy of attention.

Methodology Courses

SOC 3113 Introduction to Research Methods 2 QH

Introduces methods of social research including such approaches as field study and participant observation

techniques, survey techniques, interviewing and questionnaire construction, sampling procedures, experiment design, content analysis, and use of available data. *Open only to Law, Policy, and Society students.*

SOC 3114 Introduction to Quantitative Research 2 QH Methods

Introduces quantitative techniques of analysis of policy. Requires students to conduct individual projects. *Open only to Law, Policy, and Society students. Prereq. SOC 3113 or equiv.*

Directed Study and Dissertation

INT 3859 Directed Study in Law, Policy, and Society 2 QH

INT 3860 Directed Study in Law, Policy, and Society 3 QH

INT 3862 Directed Study in Law, Policy, and Society 4 QH

Involves independent reading and research with a faculty member.

INT 3861 Dissertation 0 QH

INT 3799 Dissertation Continuation 0 QH

Mathematics

MTH 3010 Basics of Analysis 4 QH

Explores differential calculus: topology of \mathbb{R}^n , compact and connected sets, continuous maps, uniform convergence, differentiable maps, the inverse and implicit function theorems, Riemann integrations, and change of variables. *Prereq. MTH 1311 or equiv.*

MTH 3101 Analysis 1: Real Analysis 4 QH

Studies real analysis: integration, differentiation, and measure theory. *Prereq. MTH 3020 or equiv.*

MTH 3102 Algebra 1: Linear Algebra 4 QH

Considers vector spaces, linear maps, dimensions, inverse matrices, eigenvalues, eigenvectors, determinants, symmetric, Hermitian and Unitary matrices, Jordan canonical form, and multilinear algebra. Introduces group theory: definition, subgroup, and the symmetric group.

MTH 3103 Analysis 2: Complex Analysis 4 QH

Examines complex function theory: holomorphic and meromorphic functions, calculus of residues, conformal mappings. *Prereq. MTH 3020 or equiv.*

MTH 3104 Algebra 2: Groups, Rings, and Modules 4 QH

Focuses on groups: subgroups, quotient groups, homomorphisms, and examples and classification of groups of small order. Studies rings: homomorphisms, ideals, quotient rings, integral domain, extension of rings, Unique factorization domain, Chinese remainder theorem, and Gauss' lemma. Explores modules: homomorphisms, submodules, quotient modules, exact sequence, structure of matrices and finitely generated modules over a PID, and structure theory of infinitely generated abelian groups.

MTH 3105 Topology 1 4 QH

Explores elements of point set topology, including general topological spaces, compactness and connect-

edness, products, and quotients. Also considers elements of algebraic topology, including homotopy, fundamental group, and covering spaces. Provides applications to simplicial complexes.

MTH 3106 Analysis 3: Functional Analysis 4 QH

Analyzes topological linear spaces, normed and Banach spaces, linear functionals, weak topology, linear operators, and Hilbert spaces. *Prereq. MTH 3101.*

MTH 3107 Topology 2: Homology Theory 4 QH

Explores singular homology groups, induced homomorphisms, exact homology sequence of a pair, excision, Mayer-Vietoris sequence, homology of CW complexes, and applications.

MTH 3222 Applied Statistics 4 QH

Considers level to measurement, central tendency, dispersion, relatedness and significance to differences, analysis of data through correlation, regression, F-test, Chi square tests, T-test, analysis of variance and analysis of covariance. Uses computer-based statistical subroutine packages. *Not for math graduate credit.*

MTH 3224 Biostatistics

Introduces the use of statistical techniques as applied to problems in the life sciences. Includes measures of central tendency and deviation, probability distributions, estimation and hypothesis testing, correlation and regression analysis, and analysis of variance. Uses a computer statistical package such as Minitab. *Not for math graduate credit.*

MTH 3230 Introduction to Computer Programming 2 QH and Applications

Introduces graduate students in sciences, social sciences, and humanities to computer programming and to the role of the computer in solving problems in their areas of study. Teaches students to write and run programs in the language BASIC and to use the computer for software packages related to various fields of endeavor. *Not for math graduate credit.*

MTH 3231 Introduction to Computer Programming 4 QH and Applications

Aims at graduate students in sciences, social sciences, and humanities who need to understand how computers can help solve problems in their fields of study. After instruction in the basics of computer programming and algorithm development, introduces students to examples of the computers used in different areas of human endeavor. Requires students to write programs in BASIC programming language and run them on a computer. *Not for math graduate credit.*

MTH 3302 Constructive Algebra 4 QH

Explores constructive development of some of the old familiar areas of algebra: principal ideal domains, Dedekind domains, factorial domains, and Noetherian rings.

MTH 3303 Set Theory 4 QH

Includes informal study of sets, including detailed discussion of the axiom of choice, well ordered sets, and transfinite arithmetic. Also considers versions of axiomatic set theory. Presents the consistency of the

continuum hypothesis and the axiom of choice, the independence of the continuum hypothesis, and the axiom of choice.

MTH 3307, MTH 3308, MTH 3309 Constructive Mathematics 1, 2, 3 4 QH each

On the constructive conception of mathematics, all the statements of mathematics are interpreted as being about computation and computational schemes. In this sequence of courses, the constructivist interpretation is exposed in detail, and significant portions of mathematics from areas of analysis, algebra, and geometry are developed in accord with it.

MTH 3311 Mathematical Logic 4 QH

Includes propositional calculus and quantificational logic; first order theories and their models; formal arithmetic; and Godel's First and Second Incompleteness Theorems.

MTH 3321 Algebra 3: Galois Theory 4 QH

Studies finite extensions of fields, automorphisms, structure of finite fields, normal and separable extensions, Galois group, Fundamental Theorem of Galois Theory, cyclotomic fields, solvability of equations by radicals, and applications (for example, coding theory).

MTH 3332 Commutative Algebra 4 QH

Covers prime ideals, localization, integral extensions; primary decomposition; Krull dimension; chain conditions, Noetherian and Artinian modules; and additional topics from ring and module theory as time permits.

MTH 3341 Ordinary Differential Equations and Applications 1: Perturbation 4 QH

Explores deterministic models in physical and life sciences. Considers regular and singular perturbation: dimensional analysis, linear and non-linear boundary layer problems, WKB theory, multiple scale analysis, qualitative analysis, and asymptotic analysis.

MTH 3342 Ordinary Differential Equations and Applications 2: Dynamical Systems 4 QH

Studies linear systems and the existence and uniqueness of solutions. Introduces dynamical systems: flows, stability, electric circuits, Poincare-Bendixson theorem, and closed orbits.

MTH 3343 Ordinary Differential Equations and Applications 3: Topics 4 QH

Deals with advanced topics in dynamical systems, such as Chaos or Hamiltonian systems, as determined by instructor.

MTH 3353 Partial Differential Equations and Applications 1 4 QH

Investigates first-order quasilinear and general nonlinear equations: method of characteristics; second-order hyperbolic, elliptic, and parabolic equations: separation of variables, potential theory, and Fourier transform. Applications include geometric optics; light, sound, and water waves; electric field theory; and heat diffusion. *Prereq.* Undergraduate differential equations.

MTH 3355 Partial Differential Equations and Applications 2 4 QH

Studies nonlinear second-order partial differential equations, method of successive approximations, and hyperbolic systems. Explores local and global existence for nonlinear diffusion equations, and variational and fixed-point methods for nonlinear elliptic equations. Applications may include gas dynamics, simple models of turbulence, and differential geometry. *Prereq.* MTH 3353.

MTH 3361 Numerical Analysis 1 4 QH

Surveys the problems, issues, and techniques of numerical analysis. Includes root finding, curve fitting, numerical integration, large linear systems of equations, and ordinary differential equations. Considers trade-offs, such as cost versus precision and speed versus space. Includes some programming. *Prereq.* FORTRAN or Pascal. Same as COM 3761.

MTH 3362 Numerical Analysis 2 4 QH

Studies the numerical solution of partial differential equations, with emphasis on elliptic equations and the finite element method. *Prereq.* MTH 3361 or equiv. Same as COM 3762.

MTH 3371 Optimal Control Theory 1

Considers linear and nonlinear control problems defined by ordinary differential equations, relaxed controls, existence theorems, and Pontryagin's maximum principle.

MTH 3373 Optimization 4 QH

Analyzes convex sets, linear and nonlinear programming, zero-sum games, dynamic programming, and iterated methods.

MTH 3386 Lie Theory 4 QH

Examines Lie groups and Lie algebras, the exponential map, examples, basic structure theorems, representation theory, and applications. Additional topics vary with the instructor and may include infinite-dimensional Lie algebras, algebraic groups, finite groups of Lie type, geometry, and analysis of homogeneous spaces.

MTH 3400 Geometry 1 4 QH

Discusses manifolds, differentiable structures, tangent bundles, tensors, vector fields and differential equations, Frobenius integrability theorem, and differential forms.

MTH 3402 Algebraic Geometry 1 4 QH

Concentrates on the techniques of algebraic geometry arising from commutative and homological algebra, beginning with a discussion of the basic results for general algebraic varieties, and developing the necessary commutative algebra as needed. Considers affine and projective varieties, morphisms of algebraic varieties, regular and singular points, and normality. Discusses algebraic curves, with a closer look at the relations between the geometry, algebra, and function theories. Examines the Riemann-Roch theorem, together with its many applications to the study of the geometry of curves. Studies the singularities of curves. *Prereq.* MTH 3102 and MTH 3104.

- MTH 3407 Geometry 2** 4 QH
Examines integration on manifolds, Stokes' theorem, de Rham cohomology, and Riemannian metrics: first variation formula for arc length, geodesics, exponential maps, and geodesic completeness. Introduces Lie groups: left invariant vector fields, Lie algebras, subgroups and subalgebras, homomorphisms, one-parameter subgroups, exponential maps, bi-invariant metrics, and structure equations.
- MTH 3411 Differential Geometry** 4 QH
Analyzes geometry of surfaces in the Euclidean space, with emphasis on the global aspects, using the technique of tensor calculus. Explores elements of Riemannian geometry, connections, and holonomy.
- MTH 3431 Probability 1** 4 QH
Introduces probability; independent random variables; types of convergence; laws of large numbers; characteristic functions; and central limit theorem.
- MTH 3432 Probability 2** 4 QH
Introduces stochastic processes; random walk; conditional expectations; Markov processes; multivariate normal distribution; and Brownian motion.
- MTH 3441 Statistics 1** 4 QH
Explores parametric families of distributions; estimation and maximum likelihood; confidence intervals; testing hypotheses; and likelihood ratio. *Measure theory is not a prerequisite.*
- MTH 3443 Statistical Decision Theory** 4 QH
Presents subjective probability and utility. Studies Bayesian approach to decision problems, including estimation, testing hypotheses, and linear statistical models. Considers sequential decisions, and admissibility.
- MTH 3444 Analysis of Variance** 4 QH
Discusses one-sample and two-sample tests; one-way ANOVA; factorial and nested designs; Cochran's theorem; regression; analysis of covariance; and simultaneous confidence intervals.
- MTH 3445 Topics in Statistics** 4 QH
Includes multivariate statistics and clustering; biostatistics; Stein's paradox and admissibility, foundations; and probabilistic and inferential aspects of reliability theory.
- MTH 3448 Nonparametric Methods in Statistics** 4 QH
Presents methods for analyzing the data that is not necessarily normal. Emphasizes comparing two treatments (the Wilcoxon test, Kolmogorov-Smirnov test), comparison of several treatments (the Kruskal-Wallis test), randomized complete blocks, tests of randomness and independence, and asymptotic methods (the 8 method, Pitman efficiency).
- MTH 3450 Categorical Data Analysis** 4 QH
Focuses on the analysis of data in tables, that is, with cross-classified data. Includes loglinear models (a generalization of analysis of variance methods) and logistic regression. Includes homework problems involving real data and sometimes focusing on theoretical issues.

- MTH 3452 Time Series** 4 QH
Includes analysis of time series in the time domain, the frequency domain, and ARMA models.
- MTH 3460 Pattern Recognition** 4 QH
Introduces the methods of pattern recognition: multivariate normal distribution, linear discriminant analysis, logistic regression, tree structured classification, cluster analysis, jackknifing and bootstrapping, and cross-validation. *This course is intended for students interested in computer science or applied statistics.*
- MTH 3481 Topology 3: Cohomology Theory** 4 QH
Studies homology with coefficients, cohomology groups, cup and cap products, the cohomology ring, Künneth theorem, spectral sequence of a fibration, duality in manifolds, and applications.
- MTH 3501 Data Structures** 4 QH
Considers basic structure for representing and manipulating data in computer programming: arrays, lists, stacks, queues, dequeues, trees, and binary trees. Studies applications to nonnumeric computations and searching and sorting. Requires students to write programs to implement these structures on a computer.
- MTH 3502 Computer Organization and Assembly Programming** 4 QH
Analyzes computer organization, hardware and software components, memory organization and addressing, machine representation of data, machine language and assembly programming, and subroutines and macros. Requires students to program several short exercises in assembly language and to undertake a term project at the end of the course.
- MTH 3503 Compilers** 4 QH
Studies compilers; finite automata and lexical analysis; syntax specification; parsing; syntax-directed translations, symbol tables; run-time storage administration; error detection and recovery; code optimization; and code generation. Provides for students to work as a team on a large programming project. *Prereq. Knowledge of assembly language programming and some knowledge of data structures.*
- MTH 3514 Algebraic Algorithms** 4 QH
Offers topics in algebraic algorithms in a different subspecialty each time. Topics will be chosen from: computational group theory, computational number theory, algorithms for computing with finite fields, the discrete Fourier Transform and its applications, the Knuth-Bendix algorithm for finitely presented algebras, polynomial factorization, and related topics in computer algebra. *Same as COM 3741.*
- MTH 3515 Parallel Computation** 4 QH
Considers algorithms and theories for parallel computation on fixed-connection networks and on concurrent systems having a fixed number of processors. Includes algorithms for sorting, priority queues, graph algorithms, matrix multiplication, and FFT. Allows students use of a network of micros to implement some of these algorithms. May include applications to VLSI design. *Same as COM 3640.*

MTH 3521 Automata and Formal Languages 4 QH
Explores formal models of computation and regular expressions; properties of regular sets; context-free languages and pushdown automata; Chomsky hierarchy; and computability and undecidability. *Same as COM 3710.*

MTH 3522 Foundations of Artificial Intelligence 4 QH
Examines searching, goals, plans, heuristics, and representation of knowledge: nets, frames, and inheritance. Covers logic and its role in artificial intelligence, and selected applications of these ideas in other areas of artificial intelligence. *Prereq. MTH 3501 and another computer related course. Same as COM 3410.*

MTH 3524 Discrete Mathematical Models 4 QH
Introduces the notion of mathematical model, develops mathematical models relevant to problems in psychology, sociology, environmental science, political science, and other topics. Emphasizes the use of discrete mathematical tools such as graph theory, Markov chains, and game theory.

MTH 3527 Combinatorics 1: Enumeration
Examines various techniques of enumerative combinatorics, including binomial and multinomial theorems, principle of inclusion-exclusion, recurrence relation, and generating functions. Considers Stirling numbers. Covers special topics such as distributions, partitions, and polycounting theory. Discusses topics in Matching Theory, including Hall's theorem, and Marriage Problem and Rado's Selection Principle.

MTH 3528 Combinatorics 2: Coding Theory and Block Designs 4 QH
Explores block designs, including t-designs, orthogonal Latin Squares, difference sets and finite geometries. Includes algebraic coding, including cyclic codes, Reed-Solomon codes, BCH codes, and Reed-Muller codes. *Prereq. MTH 3102.*

MTH 3529 Graph Theory 4 QH
Examines graphs and subgraphs; trees; connectivity; Euler tours and Hamilton cycles; matchings, edge colorings; independent sets and cliques; vertex colorings; planar graphs; directed graphs; networks, the cycle space; and bond space.

MTH 3530 Topics in Combinatorics 4 QH
Focuses on topics in combinatorics in a different sub-specialty each time. Includes topics such as game theory, combinatorial geometry, measurement, and algebraic combinatorics.

MTH 3534 Analysis of Algorithms 4 QH
Discusses design and analysis of fast algorithms. Topics include advanced data structures: representing partitions, union-find algorithms, and priority queues; graph algorithms: bioconnectivity, maximum flow, shortest path, and matching minimum spanning tree; algebraic problems: matrix multiplication, polynomial multiplication, string matching, and linear programming; and probabilistic algorithms: tests for primality, and factoring polynomials and integers. *Same as COM 3390.*

MTH 3535 Complexity Theory 4 QH
Analyzes theory of relationships among complexity classes of algorithms. Covers sequential, deterministic, parallel, non-deterministic, and probabilistic models of computation, and Turing and decision tree models. Considers the class NP, and questions of completeness, especially NP-completeness, reducibility, and hierarchy of complexity classes. *Same as COM 3730.*

MTH 3804 Readings in Combinatorics 4 QH

MTH 3806 Readings in Algebra 4 QH

MTH 3807 Seminar in Algebra 4 QH

MTH 3811 Readings in Analysis 4 QH

MTH 3812 Seminar in Analysis 4 QH

MTH 3818 Seminar: Dynamical Systems 4 QH

MTH 3821 Readings in Topology 4 QH

MTH 3822 Seminar in Topology 4 QH

MTH 3824 Readings in Geometry 4 QH

MTH 3826 Readings in Statistics and Probability 4 QH

MTH 3827 Seminar in Statistics 4 QH

MTH 3836 Seminar in Combinatorics 4 QH

The department offers an assortment of courses under the general heading "seminar"—MTH 3812 through MTH 3819. At the outset of each quarter, times for organizational meetings will be posted. Schedule and content are negotiated at these meetings. Students and faculty with interest in the specialty of the seminar are encouraged to attend the organizational meeting.

MTH 3841 Readings in Philosophy of Science and Mathematics 4 QH

MTH 3850 Doctoral Dissertation 0 QH
Students may take graduate courses in the College of Computer Science as required electives with permission of the student's adviser.

Physics

I. Introductory Courses

PHY 1432 Thermodynamics and Kinetic Theory 3 QH
Includes first and second laws of thermodynamics; entropy and equilibrium; thermodynamic potentials; elementary kinetic theory; statistical mechanics; and the statistical interpretation of entropy.

PHY 1433 Introduction to Nuclear Physics 3 QH
Includes nuclear structure; nuclear masses; radioactivity-nuclear radiation; radiation and matter; detectors; fission, nuclear forces; and elementary particles. *Prereq. PHY 1303 or equiv.*

PHY 1434 Introduction to Solid State Physics 3 QH
Offers a semiclassical treatment of the thermal, magnetic, and electrical properties of crystalline solids. Includes X-ray diffraction and the reciprocal lattice; elasticity and lattice vibrations; specific heat; properties of insulators; magnetism in insulators and metals; and introduction to the band theory of metals. *Prereq. PHY 1303 and PHY 1432 or equiv.*

PHY 1435 Quantum Mechanics 1 3 QH
The first of a two-quarter sequence in quantum mechanics, focuses on observations of macroscopic and microscopic bodies, and the uncertainty principle—wave-particle duality; probability amplitudes; Schrodinger wave theory; and one-dimensional problems. *Prereq. PHY 1303 or equiv.*

PHY 1436 Quantum Mechanics 2 3 QH
Continues PHY 1435. Covers discrete and continuous states; Schrodinger equation in three dimensions; angular momentum; general theory of quantum mechanics; and applications. *Prereq. PHY 1435.*

PHY 3401 Radiation Physics 2 QH
Introduces atomic and nuclear physics for graduate students in biology and pharmacy. Includes quantum mechanics and atomic structure, nuclear structure, radioactivity, properties of nuclear radiation, and detection of radiation.

PHY 3402 Radiation Biology 2 QH
Covers the effects of radiation on biological systems and the uses of radiation in medicine and biological research. Includes effects of radiation on chemical reactions; effects of radiation on cells, organs, and individuals; theories of radiation damage and repair; imaging and tracer techniques using radiopharmaceuticals; and radiation safety and standards. *Prereq. PHY 3401 or equiv.*

PHY 3551, PHY 3552 Electronics for Scientists 1, 2 4 QH
PHY 3551 and PHY 3552 form a two-quarter sequence covering electronic techniques for experimental research in many different fields of science. Topics include principles of semiconductor devices; analog techniques (amplification, feedback, integration), and digital techniques (counting, multiplexing, logic); design of electronic subsystems (analog-to-digital converters, phase-sensitive detectors, and data-logging

systems); and understanding specifications of commercial electronic equipment. Lab examples make use of up-to-date integrated and discrete devices, such as are currently used in the electronic industry.

II. Elective Courses (Offered Every Year)

PHY 3557 Graduate Advanced Laboratory 4 QH
Presents special projects in modern experimental physics, including electronic instrumentation used in measuring physical quantities and use of microprocessors. *Prereq. PHY 3551 and PHY 3552 or permission of instructor.*

PHY 3561 Graduate Project Laboratory 4 QH
Allows students to select and carry out individual projects involving instrumentation and computation. Involves the development of some aspect of instrumentation and/or computation in an ongoing research project, and the preparation of a final report. The student will be supervised by the project leader and the course instructor. Although the course carries 4 QH, it is taken in successive winter and spring quarters. *Prereq. Permission of instructor.*

III. Required Regular Courses (Offered Every Year)

PHY 3606 Computational Physics 3 QH
Studies FORTRAN, numerical analysis, and Monte Carlo methods. Topics include algebraic manipulation, minimization and maximization of functions, eigensystems, and types and uses of graphic displays in physics.

PHY 3607, PHY 3608, PHY 3609 Mathematical Methods and Classical Mechanics A, B, C 3 QH
A three-quarter sequence dealing with mathematical methods of physics and classical mechanics. The two areas are intertwined with topics selected from the following areas. Mathematical methods covers differential equations, functions of a complex variable, linear vector spaces, Green's functions, calculus of variations, partial differential equations, integral equations, and introduction to group theory. Classical mechanics covers generalized coordinates, variational principles in classical mechanics, Lagrange's equations, Hamilton's equations, symmetry and conservation laws, central forces, classical scattering theory, small oscillations, continuous systems and classical fields, and theory of special relativity.

PHY 3611, PHY 3612, PHY 3613 3 QH
Electromagnetic Theory A, B, C
Analyzes Maxwell's equations in the vacuum and special relativity. Discusses the energy-momentum

tensor in the context of radiation problems, including bremsstrahlung and synchrotron radiation. Covers cavity radiation problems (such as microwave). Treats electromagnetic properties of matter for a variety of situations: conductors, dielectrics, ferromagnets, and superconductors. Studies electrostatic and magnetostatic boundary value problems. May cover other applications, such as stopping power of matter for relativistic particles, plasma physics, and the interaction of electromagnetic radiation with gravity. *Prereq.* PHY 1403, PHY 3601 (*concurrently*).

PHY 3621, PHY 3622, PHY 3623 **4 QH**
Quantum Theory A, B, C

Explores experimental basis of quantum theory, Schrödinger equation and probability interpretation of wave mechanics, uncertainty principle, application to one-dimensional problems, the harmonic oscillator, orbital angular momentum, and the central force problem. Studies quantum theory of scattering, Born approximation, phase-shift analysis, introduction to S-matrix theory, general formulation of quantum mechanics in Hilbert space, spin, identical particles and symmetrization principle, time-independent and time-dependent perturbation theory, semiclassical theory of radiation and atomic spectra, addition of angular momentum, Wigner-Eckart theorem, quantum theory of radiation, and absorption, emission, and scattering of photons. *Prereq.* PHY 1435 or *equiv.*

PHY 3624 Advanced Quantum Theory **4 QH**
 Introduces the formulation of a relativistic quantum theory, study of the Dirac equation and its Lorentz covariance, plane-wave solution of the Dirac equation, and projection operators. Covers bound-state solutions of the Dirac equation in a Coulomb field and the hydrogen atom. Considers parity, charge conjugation, time-reversal symmetries, and propagator theory. *Prereq.* PHY 3623.

PHY 3631 Statistical Physics A **3 QH**
 Studies the phenomenological theory of thermodynamics, fundamental relations and thermodynamic potentials, extremal principles of thermodynamics, applications to simple systems, stability conditions, phase transitions, thermodynamics of electric and magnetic systems, and principles of irreversible thermodynamics. *Prereq.* PHY 3603 and PHY 3621 *concurrently*.

PHY 3632, PHY 3633 Statistical Physics B, C **3 QH**
 Explores the principles of statistical mechanics and statistical thermodynamics; density matrix; theory of ensembles; derivation of the laws of thermodynamics; Fermi-Dirac and Bose-Einstein statistics, application to gases, liquids, and solids; theory of phase transitions; second-quantization formalism for interacting systems; and cooperative phenomena. *Prereq.* PHY 3621 and PHY 3631.

PHY 3641, PHY 3642 Solid State Physics **4 QH**
 Covers topics from Drude and Sommerfeld (or free electron) models of electrons in metals, crystal structure, one-electron states in crystal lattices, Bloch's Theorem, semiconductors and semi-conducting devices, effects of electron-electron interactions, lattice

vibrations and the classical and quantum theories of specific heat, optical properties of solids, investigation of crystal structure and excited states of crystals by X-ray and neutron scattering, simple transport theory based on the Boltzmann equation, and magnetic properties of solids.

PHY 3651, PHY 3652 Particle and Nuclear Physics A, B **4 QH**

Includes nuclear models, nuclear scattering and reactions, classification of particle interactions, internal symmetries, field theory, unification of weak and electromagnetic interactions, and gauge theories. *Prereq.* PHY 3624.

IV. Advanced Elective Courses

PHY 3643, PHY 3644, PHY 3645 Advanced Solid State Physics A, B, C **4 QH**

Includes selected advanced topics in the theory of solids to be chosen each time by the interested students and instructor. Covers, for example, theory of normal metals, Hartree-Fock and Random phase approximations, optical and transport properties, solid state plasmas, Raman spectroscopy, quasiparticles and collective excitations, quantum solids, and amorphous solids. *Prereq.* PHY 3633, PHY 3623, and PHY 3642.

PHY 3653, PHY 3654, PHY 3655 Fields, Particles, and Strings A, B, C **4 QH**

Introduces a local field theory. Considers symmetries of the Lagrangian and conservation laws; S-matrix and LSZ reduction formulae; perturbation theory; Feynman diagrams; spontaneous breaking and Higgs phenomenon; Glashow-Salam-Weinberg unified theory of electro-weak interactions. Briefly introduces Einstein theory of general relativity. Discusses developments leading to string theory: normal mode expansion; open and closed strings; deduction of D=10 for bosonic and D=10 for superstrings; scattering amplitudes in strings; Heterotic String; compactifications on the torus, orbifolds and Calabi-Yau manifolds; 4-D strings; and superstring phenomenology.

PHY 3661, PHY 3662, PHY 3663 Many-Body Theory A, B, C **4 QH**

Introduces some many-body problems and the required mathematical techniques. Explores theory of linear response and correlation functions; Landau's theory of Fermi liquids and applications to solids; theory of superconductivity and superfluidity; and general theory of Green's functions and diagrammatic techniques. *Prereq.* PHY 3623, PHY 3633, and PHY 3642.

PHY 3671 Foundation of General Relativity **4 QH**

Discusses the physical basis underlying relativity (the weak and strong principle of equivalence), the role of the metric tensor as a carrier of gravitational information, and the modification of the Lorentz covariant field equations in the presence of gravitation. Introduces Riemannian geometry and discusses the Einstein field equations and tests of Einstein's theory. *Prereq.* PHY 3603, PHY 3613, PHY 3623, and PHY 3672.

PHY 3672 Relativistic Astrophysics and Cosmology 4 QH
Deals with the equations for the relativistic stellar system; white dwarfs, neutron stars, and properties of pulsars; gravitational collapse and black holes; quantum radiation from black holes; super heavy stars as possible quasar energy sources; quantum effect in gravitational collapse; the metric for cosmological systems; and the big bang theory. *Prereq.* PHY 3624 and PHY 3671.

PHY 3673 Quantum Gravity 4 QH
Deals with gravitation as a quantum field, threshold properties of gravitational quantum S-matrix, quantization leading to a set of Feynman rules, calculations of simple tree diagrams, closed loop infinities, and the problem of renormalizability of quantum gravity. *Prereq.* PHY 3672.

PHY 3798 Master's Thesis Continuation 0 QH

PHY 3799 Doctoral Dissertation Continuation 0 QH

PHY 3811, PHY 3812, PHY 3813 Reading Course 1 QH

PHY 3821, PHY 3822, PHY 3823 Reading Course 2 QH

PHY 3831, PHY 3832, PHY 3833 Reading Course 3 QH

PHY 3841, PHY 3842, PHY 3843 Reading Course 4 QH
Offers reading course, or theoretical or experimental work under individual faculty supervision. *Prereq.* *Permission of faculty member.*

PHY 3890 Master's Thesis 1 4 QH
Student will start a master's thesis in a selected topic in experimental or theoretical physics. *Prereq.* *Permission of faculty member.*

PHY 3891 Master's Thesis 2 4 QH
Offers continuation and completion of master's thesis. Requires written thesis. *Prereq.* *At least a B grade in PHY 3890 and permission of faculty member.*

PHY 3895 Doctoral Dissertation 0 QH
Offers experimental and theoretical work for PhD candidates.

Political Science

All courses carry three quarter-hours of credit unless otherwise specified. Most courses are seminars.

POL 3500 Scope and Methods of Political Science
Examines the assumptions, principles, and so on, that underlie contemporary political science. Invites the student to consider the present practice of the discipline in the light of its history and to evaluate the discipline critically in the interest of a greater understanding of political science's nature and limits.

POL 3502 American Government and Politics
Analyzes the constitutional system and national government institutions focusing on the executive, legislative, and judicial branches. Examines political parties and pressure groups and their role in the policy process. *MPA core course.*

POL 3504 Political Psychology and Socialization
Examines theories of political psychology, opinion formation, and attitude change; political ideology; processes of individual political development and socialization; effects on mass and elite political behavior; attitudinal differences and differential socialization experiences; and individual political behavior and the political system.

POL 3506 Politics and the Mass Media
Studies the role of mass media in the formation of public opinion, with special attention given to media usage in the electoral process.

POL 3508 American Legislative Process
Studies Congress and the influence of the President, administrative bureaucracy, parties, interest groups, and public opinion on the development of legislative policy. *MPA elective.*

POL 3510 Theories of American Political Participation
Focuses on political behavior at both the national electorate level and at the level of legislative roll-call voting, analyzing the relative impact of demographic and attitudinal components as well as the effect of constituency and partisan identification upon legislative behavior.

POL 3512 American Constitutional Law 1
Employs excerpts of United States Supreme Court decisions and other primary legal materials to examine the constitutional rationale for judicial review; various philosophical approaches to the exercise of judicial power; and the scope of judicial authority to settle questions challenging the legitimacy of governmental actions in the American constitutional system.

POL 3514 American Constitutional Law 2
Uses excerpts of primary legal materials to build upon the judicial doctrines developed in POL 3512 and specifically examine the constitutional theories behind the growth of congressional prerogatives in economic and social affairs and expanding presidential power in internal and foreign matters. *Prereq.* POL 3512 or *permission of the instructor.*

POL 3516 The Presidency
Analyzes the development of constitutional and extra-constitutional presidential power, examining the role of the president in formulating and executing domestic and foreign policy.

POL 3518 American Electoral Behavior
Considers the theoretical and methodological assumptions of election studies of the American political system and reviews the substantive conclusions.

POL 3519 Campaigns and Elections

Studies campaign tactics and strategies. *Fieldwork required.*

POL 3520 The Judiciary

Analyzes the role of the judiciary in the American governmental process. Emphasizes those areas of constitutional law in which the courts' decisions have a profound impact on the basic structure of American politics (apportionment, economic regulation, and federalism).

POL 3522 Political Parties

Focuses on American political parties, including such aspects as organization, nominations and party reform, elections, voting behavior, and state and national political trends.

POL 3523 Interest Groups

Surveys the role of interest groups in American politics, with emphasis on distinctions between traditional economic interests, newer types of social forces, and public interest organizations.

POL 3524 Civil Rights

Examines the doctrine of constitutionalism, illustrated and amplified by a study of the substance and process of the Bill of Rights as developed in decisions of federal courts, and congressional enactments.

POL 3526 Procedural Due Process

Uses excerpts from United States Supreme Court decisions and other legal materials to examine such as the philosophical and constitutional relationships between the Fourth, Fifth, Sixth, Eighth amendments and the Fourteenth Amendment. Examines the substance of the right to fair trial, counsel, confrontation, protection against self-incrimination, and unreasonable searches and seizures are among the many procedural rights through the decisions of the Roosevelt, Vinson, Warren, and Burger courts.

POL 3531 Models of Political Systems

Examines the detail and critiques current models of political systems.

POL 3533 Eurocommunism

Studies the ideology and political behavior of the communist parties of Italy, France, and Spain, with emphasis on their independence of, and challenges to, the domestic and foreign policies of the Soviet Communist Party.

POL 3535 Parliamentary Democracy in Western Europe

Compares environment, vehicles of popular participation, and formal structures and reach of government in the parliamentary democracies of western Europe. Gives special attention to England, France, and Germany.

POL 3537 Comparative Communism

Analyzes environment, vehicles of popular participation, and formal structures and reach of government in the Soviet Union, the socialist countries of eastern Europe, and China.

POL 3539 European Political Parties

Examines by comparative cross-national study political organization and behavior in England, France, and Germany with emphasis on party leadership, strategy, organization, and constituency as well as socialization, recruitment, and participation of voters.

POL 3541 European Legislative Systems

Compares the legislatures in Britain, France, and Germany with emphasis on patterns of historical development, functions, internal organizations, and relations with the executive.

POL 3543 European National Executives

Examines by comparative cross-national study executive decision making in England, France, and Germany with emphasis on varying patterns of presidential and cabinet authority as well as relationships with the legislature.

POL 3545 Government and Politics of the Middle East

Examines the political and economic structures of the Arab states and Israel as well as inter-Arab politics and inter-state conflict in the area.

POL 3547 Government and Politics of North Africa and the Middle East

Compares the political systems and foreign policies of African states north of the Sahara. Stresses the relationship of this area with the Middle East.

POL 3550 Government and Politics of Great Britain and Northern Ireland

Analyzes government organization and political behavior in the United Kingdom. Pays special attention to executive-legislative relations, the political party system, and the politics of Northern Ireland.

POL 3551 Seminar in International Relations

Analyzes the major actors, their goals, and the means and strategies they utilize within the international system.

POL 3552 International Political Economy

Explores new directions in the field of international political economy. Stresses approaches to and trends within the field, such as: the intellectual and theoretical roots of international political economy; the management of collective goods; relations between advanced industrial states; relations between advanced industrial and less industrial states; and relations between nonstate and state actors.

POL 3553 Government and Politics of Germany

Studies political culture, federalism, and executive-legislative relations on the national level with a view to appraising the quality and durability of the current democratic system.

POL 3554 Government and Politics of France

Studies current governmental organization and political behavior in France. Pays special attention to the role of the presidency, executive-legislative relations, and the political party system.

POL 3555 International Organization

Focuses on issues of international political economy. Emphasizes the role of various international organizations in managing economic interdependence and the role of international administrators in the United Nations' search for a new international economic order. Discusses nongovernmental organizations, such as multinational corporations.

POL 3556 China in Revolution

Addresses the problems faced by a revolutionary China in forming new attitudes, instituting a revolutionary political culture, and reconstructing and developing a country on the basis of a revolutionary ideology. Illustrates the manner in which the party, state, military, education, health, science, and medicine have been modified since 1949 to ensure the continuation of a revolutionary policy.

POL 3557 Soviet-Chinese Relations

Presents a chronological and topical analysis of the Soviet-Chinese relationship since 1950 with special attention to the causes of rivalry and conflict in the 1960s and 1970s.

POL 3558 Asia and the Politics of Development

Relates the theoretical literature on political development to the concrete attempts to develop in Asia. Encourages each student to concentrate on one state and explore different ideas about political development as they relate to that state because of the diversity in levels and types of political development in Asian states. *MPA elective.*

POL 3559 Governments and Politics of Latin America

Investigates contemporary Latin American politics with particular emphasis on revolution, development strategies, and social change. Focuses on three representative nations such as Mexico, Chile, and Cuba.

POL 3560 Politics of the Developing Nations

Considers the process of political development in the third world, including both internal and international issues such as leadership patterns, the role of the military and political parties, and underlying economic and social factors. *MPA elective.*

POL 3561 Great Powers and the Middle East

Analyzes the changing nature of great power and multinational involvement in the Middle East.

POL 3562 United States-Soviet Relations

Covers the relations between the United States and the Soviet Union from 1917 to the present. Stresses the "nonrecognition" period, the breakdown of the World War II "Grand Alliance," and the nature of the current power conflict.

POL 3563 United States-Far Eastern Relations

Analyzes American diplomacy in the Far East, with primary concentration on relations since World War II with Japan, China, and Southeast Asia.

POL 3564 China's Foreign Policy

Studies the Chinese government's relations with the Third World socialist states and the West and its behavior in the United Nations. Analyzes changing

policies toward international law, trade, tourism, scholarly exchange, and foreign ventures in China. Focuses on policy objectives strategy, tactics, and the method of decision making in the foreign policy apparatus.

POL 3565 Soviet Relations with Eastern Europe

Analyzes Soviet policy in Eastern Europe, especially Russian efforts after World War II to develop communism and maintain a position of preeminence in this region.

POL 3566 Chinese Politics

Concentrates on the objectives of the Chinese revolution from 1911 to the present. Examines the political theory and institutions established to promote "permanent revolution" and evaluates the nationality of Chinese Communist policies in terms of Chinese goals. Concentrates on the changes made in domestic, economic, legal, and political policies since 1976.

POL 3567 Japanese Politics

Examines the unique Japanese electoral system, political processes and organizations, political culture and socialization, the role of business in politics, and Japanese foreign policy.

POL 3568 Sub-Saharan African Politics

Compares the political systems and foreign policies of selected African states south of the Sahara. Focuses on the Republic of South Africa and its policy of apartheid.

POL 3569 Decision Making in United States Foreign Policy

Comprehensively analyzes of the governmental mechanism and process for foreign policy decision making in the United States. Emphasizes case studies in decision making.

POL 3570 American Foreign Policy

Examines in depth selected issues concerning the role of the United States in world affairs since 1945.

POL 3571 Ethnic Political Violence

Analyzes ethnic political violence from an international perspective. Undertakes in-depth analysis of the Northern Ireland case, with reference to other key international examples. Focuses upon causes of ethnic political violence as well as potential remedies.

POL 3572 Problems of World Order 1

Emphasizes such topics as appraisal of diverse systems of public order, approaches of international law and international organization to the problem of world order, and the problem of world peace enforcement.

POL 3573 Problems of World Order 2

Stresses political problems of world order. Includes arms control and disarmament, the limits of economic growth, international political economy, population problems, and resource distribution.

POL 3574 American National Security Policy

Deals with United States national security policy in the post-World War II era. Focuses on the evolution of United States nuclear and conventional strategy and arms control efforts. Considers future military and arms control options.

POL 3575 Arab-Israeli Dispute

The Arab-Israeli confrontation has its own dynamics and a character that has changed through the decades. Students analyze the conflict's interaction with the internal politics of the Arab states and Israel, pan-Arab politics, and the role of the great powers in the region.

POL 3576 War in International Perspective

Analyzes the causes of war as well as policies for the prevention of war. Considers the changing technologies and strategies of war from both a historical and contemporary perspective. Considers specific past and present wars from an international perspective.

POL 3578 Soviet Foreign Policy

Studies Soviet foreign policy since 1964. Discusses detente in relations with the United States; polycentrism in East Europe; involvements and commitments in the Middle East and Africa; and the dispute with China.

POL 3580 The United Nations

Analyzes selected topics on the nonpolitical work of the United Nations: human rights; economic, social, health, and related problems; and decolonization and the trusteeship system.

POL 3581 International Peacekeeping

Investigates the origins, history, and theory of interventionary peacekeeping, with reference to the documentation of the United Nations. Explores an assessment of this method of maintaining regional stability and a projection of potential means of developing the method to broader applicability.

POL 3583 International Law

Examines selected topics in international law not covered in POL 3572 and POL 3573.

POL 3584 Regional Organizations

Studies regional organizations, such as EEC or OAU, to determine the capability of such organizations to promote economic development and political influence.

POL 3585 The Atlantic Community

Analyzes European-American diplomacy with particular stress upon security and economic matters. Considers the integration of Europe, American responses, and the results of these interactions for world political and economic stability.

POL 3586 Nationalism

Studies the evolution and role of nationalism in both theory and practice. Analyzes representative nationalistic movements and theories.

POL 3587 Politics of Revolution and Change

Analyzes the nature of political change with attention to both theory and practice. Discusses revolution, major trends in contemporary politics, and the relationship between political change and technological, scientific, or social change.

POL 3589 Terrorism, Violence, and Politics

Analyzes the theory and practice of terror, violence, coercion, force, and threats in political life.

POL 3590 Crisis Politics in Democracies and Dictatorships

Analyzes governmental response to crises and emergencies. Considers such topics as war powers, riot and rebellions, martial law, transfer of regime, succession problems, economic crises, presidential emergency powers, national security powers, executive privilege, and impeachment.

POL 3591 Totalitarianism

Analyzes totalitarianism and dictatorship, including study of historical background, fundamental characteristics; theories of origin, nature, and significance; and evaluation of techniques, ideologies, policies, and instruments of power. Emphasizes the government and politics of the Soviet Union.

POL 3593 Ancient and Medieval Political Thought

Focuses on the development of political thought from Greek antiquity to the end of the Middle Ages, utilizing both historical and analytical approaches. Considers the cultural, social, and intellectual context within which political theories develop.

POL 3594 Modern Political Thought

Examines political thought from Machiavelli to Marx.

POL 3595 Contemporary Political Theory

Explores the main currents of political thought in the latter half of the nineteenth and the twentieth centuries with special emphasis on the relations between political theory philosophy and political science.

POL 3596 Marxism

Examines the theory and practice of Marxism, including its background and origins, and its subsequent development.

POL 3597 Trends in American Political Thought

Examines intellectual concepts and movements that have informed and influenced American political life, with emphasis upon those relating to the making and execution of public policy. *MPA elective.*

POL 3600 Introduction to Public Administration

Introduces literature and the major topics in public administration with special attention given to the interrelationships of politics and administration. *MPA core course.*

POL 3601 Public Personnel Administration

Introduces students to the public personnel function from a managerial standpoint. Addresses methods of constructive leadership of government personnel, leadership that encourages a more competent, motivated, and representative, public administrative workforce. Employs case studies and films, along with assigned readings. *MPA core course.*

POL 3602 Organization Theory and Management

Examines the general principles underlying organizational structures and processes. Topics include models and ideal types, open systems theories, organizational technologies, decision making, and organizational development and change. *MPA core course.*

POL 3603 Public Budgeting and Financial Management

Emphasizes the public budgeting function in its relationship to other functions of public administration.

Approaches the subject from a management perspective, and examines conflicting legislative and executive finance and budgeting interests. Includes an illustration of the budget cycle and an examination of the mechanics of budget preparation. Considers means for improving budget decision making and administration through quantitative and other methods. *MPA core course.*

POL 3604 Techniques of Policy Analysis

Introduces the study of public policy analysis. Provides a systematic approach for understanding the origins, formulation, implementation, and impacts of government "outputs." Following a review of key analytic concepts and alternative theoretical perspectives, considers the political dimensions of public policymaking as well as the technical aspects of program design and evaluation within the general framework of the "natural history" of the policymaking process. Uses case materials drawn from a broad spectrum of contemporary substantive policy areas. *MPA core course.*

POL 3605 Quantitative Techniques 1

Considers the theory and process of analytical reasoning about policy issues using statistical methods and computers. Topics include descriptive statistics, inference, and bivariate analysis. *MPA core course.*

POL 3606 Quantitative Techniques for Public Administrators 2

Presents an intermediate course in quantitative methods with an emphasis on techniques and practical applications of value to administrators and analysts in the public sector. Includes significance testing, bivariate regression correlation, and multiple regression and multiple correlation. Teaches how to generate and interpret statistical analyses through use of the SPSS "packaged" program. *MPA core course. Prereq. POL 3605.*

POL 3610 Methods of Economic Analysis for Public Administrators

Introduces a construct of public economy as a means for focusing on contemporary economic issues facing public administrators. Serves as a prerequisite for students lacking economic course work at the baccalaureate level. *MPA core course.*

POL 3611 Intergovernmental Relations

Offers an institutional-behavioral analysis of the changing relationship among the various levels of American government—national, state, and local—relating the pattern of change to the social and economic forces that underlie it. *MPA elective.*

POL 3613 Constitutional Law in Public Administration

Introduces American constitutional law and the federal system using case materials and emphasizing principles of importance to public administrators, including such constitutional concepts as separation of powers, judicial review, dual federalism, legislative investigating power, executive impoundment, federal preemption, and the appointment and removal power. *MPA elective.*

POL 3614 Administrative Ethics in Public Management

Analyzes ethical problems in American public administration including discussion of ethical dilemmas frequently faced by public managers. *MPA elective.*

POL 3615 Development Administration

Takes a "manager's-eye view" of the formulation, implementation, evaluation and improvement of development projects in less developed countries. Includes integrated rural development, community participation, lower- and middle-level management decentralization, and management training. *MPA elective.*

POL 3616 State Government

Appraises the problems of contemporary state government in the United States. Emphasizes the state government of Massachusetts. Stresses individual research. *MPA elective.*

POL 3622 Urban Government

Explores problems in urban government such as political independence, government finance and administration, rapid growth of suburban and metropolitan areas, and decline and decay of the core city. Emphasizes the Boston metropolitan area. Stresses individual research. *MPA elective.*

POL 3623 Transportation Policy

Examines the role of politics, governmental mechanisms, and public policy in the transportation planning process. Emphasizes political interest groups and how they affect transportation policy on the federal, state, and local levels. *MPA elective.*

POL 3624 Problems of Community Development

Examines the role of government, politics, and public policy in the urban process and related problems in the United States. *MPA elective.*

POL 3625 Collective Bargaining and Labor Relations in the Public Sector

Studies labor relations in public enterprises, with special emphasis on the role of public employee unions and collective bargaining. Emphasizes labor relations in the public sector (including employee rights and legal issues) and the history, theory, techniques, and impacts of public employee unionism and collective bargaining. *MPA elective.*

POL 3626 Grantsmanship

Provides students the opportunity to increase their knowledge of the federal grant system. Emphasizes developing effective grant proposals and improving management skills. *MPA elective.*

POL 3629 Computer Applications

Provides basic knowledge of computer applications for public administrators. Develops an understanding of computer technology as a resource in government decision making and administration. Topics include management information systems, database management, spreadsheet applications, critical path methods, PERT, and word processing. *MPA core course. Covers requirement previously met by POL 3607.*

POL 3630 Health Administration

Introduces the process and purposes of management within hospitals and other health care organizations. Includes financial management, quality control, strategic planning, personnel management, marketing, and information systems. *MPA elective.*

POL 3631 Urban Development

Helps students analyze urban development issues and learn how to be effective in creating and implementing public development policy and programs. Explores subsidies and taxes, housing, commercial and industrial development, and job creation and training projects in terms of their historical, political, economic, and social dimensions. Emphasizes developing a development program through the role-playing method. *MPA elective.*

POL 3632 Public Fiscal Management

Studies the interrelationships in public administration between systems of finance and the achievement of program objectives. Stresses aspects of the budgetary process that bear on fiscal policy and appropriations. *MPA core course.*

POL 3634 Functions and Techniques of Public Management

Provides an introduction to problems in public management and techniques for dealing with them including functions of middle management, supervision, administration of staff activities (for example, planning, personnel, budget), organization and methods, public relations, managerial use of computer-based techniques, and tactics and strategies of management. *MPA elective.*

POL 3635 Environment and Energy Policy

Considers the legal, political, administrative, and intergovernmental factors involved in the formulation of public policy and the exercise of public power in regulating the use of the environment. Stresses individual research. *MPA elective.*

POL 3636 Comparative Public Policy

Offers an analysis of public policy in a comparative perspective. Focuses on a number of specific policy sectors and problems. *MPA elective.*

POL 3637 Comparative Public Administration

Compares approaches to public administration in selected democratic governments in the United States and Europe. *MPA elective.*

POL 3638 Marketing for Public Managers

Introduces present and future public managers to traditional marketing concepts and analyzes how using these concepts can create effective public programs. *MPA elective.*

POL 3639 Federal Administrative Law

Studies rule making, adjudication (formal and informal), administrative finality and judicial review, administrative procedure, scope of administrative powers, and enforcement techniques. *MPA elective.*

POL 3640 Governmental Accounting

Examines principles and procedures involved in governmental accounting. *MPA elective.*

POL 3641 Techniques of Program Evaluation

Reviews methodologies for assessing public policy outcomes with a special emphasis on health and social welfare programs. Includes experimental and quasi-experimental research designs, the value and limits of case analysis, political and organizational barriers to effectively conducting an evaluation, writing the evaluation study report, and procedures for instituting needed program change following the evaluation. *MPA elective.*

POL 3642 Management Planning and Decision Making

Reviews the growth of the planning approach to public management and of its application in specific agencies. Includes organization of the management planning function, budget planning, and methods of providing planning forecasts. *MPA elective.*

POL 3643 Organizational Psychology and Behavior

Examines the literature, theories, and concepts of administrative behavior as it has evolved with emphasis on the development of self-awareness and the building of interpersonal skills. *MPA elective.*

POL 3644 Public Policy Issues in Human Services

Discusses the origins and development of the Social Security Public Assistance Income Maintenance and various health-care programs. Focuses on controversial public policy issues of retirement, survivors, disability insurance, Aid to Families with Dependent Children, Medicare, and Medicaid, with the objective of helping students to develop understanding of the push and pull of many different viewpoints involved in public policy development. *MPA elective.*

POL 3645 Program Implementation

Examines the implementation stage of the policy process, specifically the implementation of federally funded social programs by local governments. Includes intergovernmental fiscal configuration; the capacity to implement; the politics of implementation; and implementation feasibility. *MPA elective.*

POL 3646 Position Management

Examines the bases of position classification at the state, federal, and local levels. After reviewing the process of job analysis, examines several classification schemes including the new federal factor benchmark system. Includes wage and salary administration. *MPA elective.*

POL 3647 Manpower Policy and Administration

Introduces the student to human resource policy and management issues within a broader context of social policy. Includes an investigation of specific manpower programs and current issues of importance to the administrator. *MPA elective.*

POL 3648 Legal Topics for Health Administration

Provides an overview of legal issues and topics of relevance to the field of health administration, including malpractice, accreditation, and affiliations. *MPA elective.*

POL 3649 Regulatory Administration

Offers the public manager a conceptual and historical overview of the development of regulatory policy and

mechanisms, focusing on issues at the public-private interface as well as evaluating the practical implications of government intervention. Evaluates the political, economic, and administrative effects of a nonregulatory versus regulatory approach to public management. *MPA elective.*

POL 3650 Group Dynamics

Focuses on the human problems public managers face in their daily work based upon an introductory understanding of organizational psychology and behavior. Using a group dynamics format, provides the opportunity to integrate the literature in organizational psychology, work issues, and personal growth concerns. *MPA elective.*

POL 3651 Legal Issues in Public Finance and Budgeting

Examines the historical and contemporary legal issues that are most relevant to public finance. Includes legal issues in taxation and borrowing, budget execution and auditing, employee liability, and budget reform. *MPA elective.*

POL 3652 Civil Liberties in Public Administration

Discusses First Amendment rights as they impact upon the public sector. Referring to appropriate court cases, includes employee rights and obligations with respect to freedom of speech, freedom of association, loyalty oaths, and professional certification, as well as legislative powers. *MPA elective.*

POL 3653 Survey Research for Public Administration

Focuses on the entire survey research process from sample selection to data analysis. Discusses regression for time series analysis and some computer applications. *Prereq. POL 3605.*

POL 3654 Computer Software for Public Administrators

Introduces several software packages for statistics, management file construction and use, word processing, and graphics. *Prereq. POL 3605.*

POL 3655 Politics and Administration in Cities and Towns

Examines the political and administrative structures that influence the conduct of city and town governments. Emphasizes dynamic relationships between these structures and the implications for public policy-making. *MPA elective.*

POL 3656 Business/Government Relations

Extensively examines the relationship between the United States government and the private economy from a historical and a contemporary perspective. Analyzes a number of public policy areas in which public and private actors interact. Examines stabilization policy, regulation, antitrust, and social welfare policy in the context of alternative interpretations of the United States political economy. *MPA elective.*

POL 3657 Organizational Analysis

Studies the structure and processes of organization essential for problem solving and for effecting organizational change. Emphasizes the application of social science theory and administrative principles in administrative problem identification and problem resolution. *MPA elective.*

POL 3658 State and Local Finance and Budgeting

Explores the many channels that the state budget must travel before it becomes a viable document. Explores in depth the several ways by which the budget can be affected before and after it is signed into law. *MPA elective.*

POL 3659 Municipal Finance

Discusses the special problems of budgeting and finance in local governments, including budget preparation and presentation, debt management, capital financing, and local taxation policy. *MPA elective.*

POL 3660 Development Planning

Focuses on the dynamics and activities of host-government, bilateral, and multilateral organizations as they analyze and tackle such problem areas as agriculture, education, health, population, and land reform in developing countries. Stresses the special role of public administration in less developed countries. *MPA elective.*

POL 3661 Municipal Law

Reviews for the nonlawyer the law of municipal corporations. Includes general powers and duties, charters, ordinances, administrative rules and regulations, officers and employees, tort liability, policy powers, planning and zoning, taxation and borrowing, elections, and licenses and permits. *MPA elective.*

POL 3662 Comparative Urban Government and Administration

Analyzes decision-making structures and processes in selected urban areas, including an examination of world organization trends and implications for administration and politics of cities; changing scopes, scale, participants, and organization of urban politics; and selected issues such as *urban housing finance*, leadership, planning, and goals. *MPA elective.*

POL 3663 Techniques of Public Budgeting

Introduces the practical skills necessary for the formulation, evaluation, and presentation of budget data. Analyzes budgetary information (raw data) provided from computer simulations and from state and local governments and adapts it to various types of budget formats. *MPA elective.*

POL 3664 Contemporary Issues in Public Finance and Budgeting

Studies public budgeting in the context of the political, financial, and economic environment of present-day government. Emphasizes contemporary issues and events which affect budgetary processes in the public sector is included. *MPA elective.*

POL 3665 Women in Public Management

Analyzes the multiple roots of problems experienced by women in public management positions and solutions for alleviating such problems. Requires students to engage in experiential learning exercises in addition to academic work. *MPA elective.*

POL 3666 Housing Crisis

Surveys the housing problems associated with the poor, the elderly, and middle-class citizens. Studies housing policies that have been enacted on the national

and local levels and assesses the impact of these policies. *MPA elective*.

POL 3667 Equal Opportunity in Public Administration

Examines barriers to EEO; helps students develop an awareness of issues surrounding the Affirmative Action Program and particularly some of the historical perspectives of discrimination against minorities and women; and offers instruction in techniques for developing a meaningful equal opportunity program for public organizations. *MPA elective*.

POL 3668 Legal Issues in Public Personnel Administration

Reviews and discusses fact situations and evidence that give rise to public employment litigation with emphasis on civil rights and Equal Employment Opportunities court actions. Discusses the type of evidence used in litigation and the types of defenses available to public employers. *MPA elective*.

POL 3670 Public Relations in Public Administration

Focuses on evaluating the public manager's role in the process of communication with the public. Evaluates issues of imagery and accountability as well as current topics. *MPA elective*.

POL 3671 Social Welfare Policy and Administration

Examines the historical, political, social, and economic determinants of the United States social welfare system. Analyzes current policies and programs using a dynamic systems model. Includes practical experience from all levels of government. *MPA elective*.

POL 3672 Policy Issues and Administration in Mental Health Care

Analyzes policymaking and administration within the contemporary mental health system, with a special focus on the process and impacts of deinstitutionalization. *MPA elective*.

POL 3673 Career Development

Helps students make career choices, identify their own career stages, and better understand their role as part of a work organization, with the purpose of assisting students in career planning. *MPA elective*.

POL 3674 Federal, State, and Local Financial Relations

Explores the relationships between the local and state levels of government in the assessment and collection of taxes, budgeting, debt management, and state aid. Evaluates the federal role and fiscal intergovernmental relations. *MPA elective*.

POL 3675 Health Policy and Politics

Introduces the study of modern health care policies, programs, and politics. Begins with a descriptive overview of the contemporary health system in America, followed by analysis of major issues and problems in the areas of ambulatory care, acute inpatient care, and long-term care services. Discusses the current crisis in health care costs, together with various proposed solutions such as health planning, certificate-of-need regulation, and different health insurance reimbursement mechanisms. Includes the deinstitutionalization of the mentally ill, medical ethics, and the foreign experience in health care. *MPA elective*.

POL 3676 Practices in Self-Development in Public Management

Focuses upon practical aspects of public management. Includes time management, communication (for example, memorandum and report writing), control processes, and conflict management. *MPA elective*.

POL 3677 Elder Services Policy and Administration

Investigates the historical, socio-economic, and philosophical determinants of the emerging elder services system. Studies current policies and programs using various comparisons, case studies, and dynamic models. Focuses on contemporary problems in the administration of elder care delivery systems, funding sources, and future trends. *MPA elective*.

POL 3678 Federal Bureaucracy

Examines dynamic and structural aspects of the national government, with attention to the place of the national administration in the federal system. *MPA elective*.

POL 3679 Contemporary Issues in Third World Development

Examines the major themes in development studies today. Explores approaches to development and modernization, dependency theory, food aid and production, population growth, equity and poverty, rural and urban development, health and nutrition, education, and the international context of development assistance. Students considering a development administration concentration should try to take this course as their first in the field of development. *MPA elective*.

POL 3690 Topical Seminar

Offers a special seminar dealing with current important issues relevant to public administration. *MPA elective*.

POL 3696 Politics of Finance and Budgeting

Examines the political environment of public budgeting from both historical and contemporary perspectives. Stresses the relationship between executive and legislative institutions at the federal, state, and local levels. *MPA elective*.

POL 3697 Seminar in Public Personnel Administration

Analyzes specific topics and issues in public personnel administration to present material of current interest and allowing in-depth research into specified areas where appropriate. Subject matter to be covered is described in registration materials. *MPA elective*.

POL 3698 Case Studies in Policy Analysis

Provides the opportunity for detailed analysis of key issues in public policy. Requires students to complete oral and written analyses of case studies that reflect these issues. Emphasizes developing the ability to utilize the relevant analytic techniques in resolving the problems confronting government. *MPA elective*.

POL 3699 Seminar in State and Urban Administration

Analyzes specified topics and issues in state and urban administration with the purpose of presenting material of current interest and allowing in-depth research into specified areas where appropriate. Subject matter to be covered is described in registration materials. *MPA elective*.

| | |
|--|-------------|
| POL 3798 Master's Thesis Continuation | 0 QH |
| POL 3884 Assigned Reading | 1 QH |
| Offers assigned reading under the supervision of a faculty member. | |
| POL 3886 Assigned Reading | |
| Offers assigned reading under the supervision of a faculty member. | |
| POL 3890 Assigned Reading | 6 QH |
| Offers assigned reading under the supervision of a faculty member. | |

| | |
|--|-------------|
| POL 3891 Internship | |
| Offers study directly related to an internship assignment. | |
| POL 3892 Internship Readings and Analysis | |
| Offers study directly related to an internship assignment. | |
| POL 3895 Thesis | 6 QH |
| Offers thesis supervision by individual members of the department. | |
| POL 3896 Thesis | 9 QH |
| Offers thesis supervision by individual members of the | |

Psychology

All courses carry three quarter-hours of credit unless otherwise specified.

PSY 3013 Learning, PSY 3014 Neuropsychology 1, PSY 3015 Neuropsychology 2, PSY 3016 Language, PSY 3017 Cognition, PSY 3018 Perception, PSY 3019 Sensation, PSY 3020 Personality, PSY 3021 Social Psychology

Proseminar

Serves as first-level graduate courses. Include faculty lectures, student presentations, and discussions of important theoretical, experimental, and methodological approaches to the understanding and explanation of behavior and the mental processes underlying behavior. Emphasizes language and cognition; learning motivation and behavior analysis; behavioral neuroscience; sensation and perception; and social/personality.

PSY 3111, PSY 3211, PSY 3311 Quantitative Methods 1, 2, 3

Surveys the quantitative methods used in experimental psychology, emphasizing applications of computer programming, theory of functions and relations, curve fitting, probability functions, set theory, and analysis of variance.

PSY 3119, PSY 3219, PSY 3319 Attention 1, 2, 3

Considers the topic of attention (selective and general, for example, arousal, and attentiveness). Discusses behavioral, cognitive, and physiological aspects.

PSY 3191 Heredity and Society

Critically examines behavior-genetic research, its social-historical setting, methods, and substantive conclusions. Begins with research on the genetics of intelligence and continues on to the genetics of psychopathology and, depending on class interest, such areas as criminality, alcoholism, and obesity.

PSY 3449 Current Issues in Experimental Psychology

Discusses current theoretical and methodological issues in selected areas of experimental psychology.

Experimental Personality and Social Psychology

PSY 3171, PSY 3271 Psychopathology 1, 2 **4 QH**

Considers the major forms of psychopathology, including the neuroses (obsessional states, hysteria, anxiety states, phobias), the psychoses (schizophrenia, mania,

depression, paranoia), psychosomatics, sociopathy, conduct disorders, organic disorders, and mental retardation.

PSY 3371, PSY 3372, PSY 3373 Social Psychology 1, 2, 3

Surveys theory and research in social psychology. Covers attitude and attitude change, aggression, altruism, group processes, person perception, and social cognition.

PSY 3477, PSY 3577 Personality Theory and Research 1, 2

Surveys representative theoretical formulations of the normal personality and its development, and examines experimental evidence bearing upon relevant concepts and assumptions (anxiety, repression, aggression, cognitive styles).

Language and Cognition

PSY 3126 Child Language Development

Contrasts learning theory approaches to language acquisition with psycholinguistic and neurogenic theories. Analyzes works of Skinner and Chomsky, and discusses implications for both normal and abnormal language development.

PSY 3161, PSY 3261 Cognition and Psycholinguistics 1, 2

Offers research in cognition and psycholinguistics.

PSY 3166 Psycholinguistics

Provides in-depth analysis of research methods and findings in selected problems in the psychology of language, including developmental, anthropological, and experimental psycholinguistics.

PSY 3167 Topics in Cognitive Development

Presents different theories of cognitive development. Possible issues include: the implications of stage theories; the relationship between cognitive development in a person and theory change in science; the difference between knowledge acquisition in childhood and in adulthood; the nature of the mind at birth; whether there are any alternatives to theories postulating stages or simple knowledge accumulation; and the role of constraints in development.

PSY 3169 Seminar in the Structure of American Sign Language
Introduces students to current issues in linguistic theory as well as to update them on the specific literature on ASL research. Focuses upon one particular area of linguistic theory as it relates to current ASL research; for example, phonology, morphology, syntax, semantics, or discourse.

PSY 3264 Language Acquisition

Present an overview of issues in language acquisition that will be integrated with in-depth discussions of selected topics.

PSY 3269 Linguistic Theory and ASL: Special Topics

Focuses upon a particular body of literature related to current linguistic theory and its relevance to ASL. Involves extensive reading of current articles and dissertations in linguistics in general and in ASL linguistics. Requires students to do presentations during the course of the seminar. *Prereq.* *Introduction to ASL linguistics or introduction to linguistics.*

Learning and Behavioral Analysis

PSY 3121 Experimental Design in Applied Research

Studies in detail of experimental methods, emphasizing critical analysis of published research reports and the implementation of the methods in service settings. Provides the opportunity to learn and evaluate observational measurement and data-collection techniques. Requires a feasible experimental design, with graphed actual or hypothetical data, that must be written in the form of a scientific report.

PSY 3122, PSY 3222, PSY 3322, PSY 3422, PSY 3522

Applied Programming Seminar 1, 2, 3, 4, 5

Allows students to design, test, and evaluate instructional programs for teaching specific subject matter for remedial application to behavior problems and to test instructional theory. Provides supervision through a weekly programming research and data seminar in collaboration with the student's adviser.

PSY 3123 Programmed Learning

Reviews the history and theoretical and experimental bases of programmed instruction and errorless learning. Emphasizes the detailed analysis of stimulus control—its measurement, and ways to produce it.

PSY 3129 Mental Retardation Seminar

Provides an interdisciplinary seminar taught by faculty from the several Boston-area universities associated with the University-affiliated facility. Defines the role of each discipline in the care and treatment of retarded people and coordinates with the functions of other relevant disciplines. Includes specialties of communication disorders (Emerson College), dentistry (Tufts University), medical disciplines (e.g., pediatrics, neurology, orthopedics, genetics—Massachusetts General Hospital, Harvard Medical School), nursing (Boston University), nutrition (Framingham Teacher's College), occupational therapy and physical therapy (Sargent College of Boston University), social work (Boston University and Simmons College), sociology (Brandeis University), special education (Boston Uni-

versity), and psychology (Northeastern University).

PSY 3132, PSY 3232 Behavior Intervention 1, 2

Focuses on behavioral intervention techniques. Emphasizes the functional analysis of behavior.

PSY 3133, PSY 3233, PSY 3333

Advanced Learning Seminars 1, 2, 3

Covers contemporary research in operant conditioning, with emphasis on relating the techniques of behavioral analysis to problems of reinforcement, motivation, comparative psychophysics, and physiological psychology.

PSY 3143, PSY 3243 Learning Principles and Applications 1, 2

4 QH

Analyzes principles from behavioral learning research and their application to the process of behavior change for learning, remediation, and treatment. Stresses educational settings.

PSY 3229 Administration of Mental Retardation Services

Presents comprehensive overview of general and specialized services for retarded individuals from organizational and administrative points of view. Considers issues in planning and initiating new programs, service delivery, staffing, and economics. Includes visits to varied types of facilities to focus on administrative concerns.

PSY 3321, PSY 3421 Systematic Inquiry in Applied Research 1, 2

Requires each student to collect a comprehensive bibliography on a significant topic in applied behavior research and complete a thorough review via written and oral presentations. Emphasizes the integration and analysis of experimental findings and theoretical foundations of the research area, the critical evaluation of current research, and the definition of potentially fruitful future work.

PSY 3324 Behavior Change in Institutions

Review successful projects that have been carried out to provide effective remediation and rehabilitation in institutions for the mentally retarded, the juvenile delinquent, and the developing individual (schools).

PSY 3336 Memory

Provides a seminar covering theoretical, experimental and methodological issues relevant to the study of remembering and forgetting.

PSY 3649 Community Based Treatment

Focuses on the treatment of mentally retarded individuals in a community setting.

Neuropsychology

PSY 3127, PSY 3128 Neurological and Sensory Impairments Seminars 1, 2

Analyzes etiology, assessment, and diagnosis, clinical characteristics, and education of the mentally retarded with visual, hearing, and motor deficits. In addition to discussion, provides experiences in evaluation and remedial programming, via the application of operant techniques.

PSY 3145 Human Neuropsychology 1

Addresses brain function and structure. Relates specific disorders seen in the clinical population to disfunction of the nervous system.

PSY 3151 Brain and Behavior 1

Introduces basic methods of physiological psychology, including animal surgery, electrical stimulation of the brain, electrophysiological recording, and histological techniques. Presents the opportunity to gain experience in these methods by carrying out a limited research project during the semester. Enrollment limited to ten. *Prereq.* Admission to doctoral candidacy or permission of instructor.

PSY 3155, PSY 3255 Sensory Psychophysiology 1, 2

Concentrates on the anatomy and physiology of the various sensory systems and correlation of these data with psychophysical and perceptual concepts. Includes lab work.

PSY 3158 Psychobiology of Reward Processes

Examines the brain mechanism psychobiology of reward or reinforcement processes, focusing heavily on the psychophysical method in brain stimulation reward. Studies how behavior can be used to measure refractory periods, latent potential summation, conduction velocity, and other properties of the directly excited neural tissue. Compares various reward measurement paradigms in regard to pharmacology studies and self-stimulation-associated phenomena such as priming or stimulation-induced feeding. Discusses other rewards, including stimulant drug self-administration and food reward.

PSY 3159 Neurochemistry and Behavior

Examines different experimental approaches to the problems involved in uncovering the relationships between changes in brain activity and changes in behavior produced by drugs. Discusses current theorizing on the role of early experience, environmental factors, biological rhythms, and other facets in the determination of drug-induced behavioral changes.

PSY 3225 Biological Bases of Mental Retardation

Considers the relationship between biological malfunction, of the brain in particular, and the defective learning ability and other behavioral abnormalities which constitute mental retardation. Aims toward as comprehensive a survey as time permits. Includes actual case presentations as illustrative examples.

PSY 3251 Brain and Behavior 2

Presents selected topics in the neurophysiology of perception, emotion, motivation, learning, and memory, with emphasis upon a critical evaluation of recent literature. Enrollment limited to fifteen. *Prereq.* Admission to doctoral candidacy or permission of instructor.

PSY 3265 Human Functional Neuroanatomy

Studies the neuroanatomy of the human brain through the direct inspection of human brain tissue in a laboratory style format. Considers functional considerations as a consequence of anatomical structure. Requires considerable independent study with the specimens

and text. Requires students to be responsible for memorizing anatomical details as well as understand broad principles of brain organization, development, and action. Also presents clinical manifestations of brain damage.

PSY 3295 Special Topics in Behavioral Neuroscience

In recent times considerable published work has appeared on the topic of computation in both model and real neuronal networks. The fundamental (and old) idea is to understand brain function by examining how its elements perform calculations. This seminar is intended to introduce students in the behavioral sciences to selected topics in computational neuroscience. Topics will be selected on the criteria of recent publication in an area of sustained advancement and will include computation models in vision, audition, the control of movement, and learning. To maintain the introductory spirit, the seminar will begin with a tutorial on the physiology of neurons, synaptic transmission, and computation in simple nerve nets (two and three elements).

PSY 3355, PSY 3455, PSY 3555 Physiological and Comparative Psychology 1, 2, 3

Present seminars on a shared background, key concepts, and central issues in the field of physiological and comparative psychology.

Sensation and Perception**PSY 3185 Electrophysiological Recording**

Discusses methods for recording electrophysiological activity from the human subject including electroencephalography, auditory and visual-evoked potential recording, electroretinography. Considers some of the principal findings that have been obtained with these methods and their importance for the interpretation of a variety of psychological phenomena.

PSY 3188, PSY 3288, PSY 3388 Vision 1, 2, 3

Provides seminars in classical and modern problems in vision. Presents recent journal articles as primary source materials for discussion. Considers problems of stimulus specification, retinal structure, photochemistry, and psychophysical measures of sensitivity, color vision, and electrophysiology.

PSY 3189 Psychoacoustics

Deals with the relationship between sound and auditory perception. After five tutorial sessions on the physics and laboratory generation of sound, thresholds, masking, loudness, pitch, and sound localization, requires students to lead discussions based on research papers in the psychoacoustic literature.

PSY 3289 Perception

Considers in detail research in such areas as form, space, and pattern perception, recognition, and the effects of set and motivation on perception. Considers physiological concomitants of perceptual phenomena.

PSY 3418 Modern Psychophysics

Offers a mathematical study of signal-detection theory; human and animal psychophysical methods; and theory of the ideal observer.

Special Topics

PSY 3291 Research Laboratory 1 QH
Allows students and faculty advisers to discuss lab projects, current literature, theory, and applications.

PSY 3419 Special Topics in Psychology 3 QH

PSY 3521 MABA Research 0 QH
Students enrolled in the MABA program may sign up for this course beginning in their *third* year to indicate that they are continuing their research.

PSY 3549 Practicum
Offers supervised practicum experience emphasizing the application of principles of psychology to human behavior.

PSY 3798 Master's Thesis Continuation 0 QH
Offers continuation of experimental work for the master's degree requirement.

PSY 3799 Doctoral Dissertation Continuation 0 QH
Offers continuation of experimental and theoretical work for PhD candidates.

PSY 3891 Thesis 2 QH
Offers experimental work for the master's degree requirement.

PSY 3894 Dissertation 0 QH
Offers experimental and theoretical work for PhD candidates.

Interdisciplinary Courses

INT 3225 Foundations of Neural Science
Introduces some of the fundamental problems and principles of neuroscience, emphasizing its multidisciplinary nature. Topics include nerve cell biology, nerve cell chemistry, central nervous system chemistry and disorders, visual perception's neural basis, developmental changes in nervous system tissue, and the neurobiology of motivated behaviors. Introduces the nervous system and how it may be studied, indicating the neuroscience resources available at Northeastern University. Includes lectures by specialists in each of these areas.

INT 3226 Topics in Neural Science
Offers lectures by specialists on central concepts, themes, and commonly used methodologies in neuroscience. Presents practical and theoretical aspects of neuroscience. Draws topics from current Society of Neuroscience Meeting Programs based on guest speakers' availability.

**Graduate School of
Boston-Bouvé College of Human
Development Professions**

All courses carry four quarter-hours of credit unless otherwise specified. Please see the current schedule for summer, fall, winter, and spring quarter listings.

Counseling Psychology, Rehabilitation, and Special Education

CRS 3400 Alternatives for Mainstreaming Individuals with Special Needs

Educates administrators, teachers, and specialists who are involved with mainstreaming individuals with special needs. Explores alternatives in decision-making and program development, implementation, and evaluation with members of various disciplines who provide services for special needs children.

CRS 3401 Educating Individuals with Learning Disabilities

Surveys behavioral and socio-emotional characteristics of children and youth who manifest specific defects in perceptual, integrative, or expressive processes that impair learning. Analyzes current service delivery programs, individual learning styles, and related curriculum materials for elementary through high school-aged, learning disabled students.

CRS 3404 Education of Individuals with Behavioral Disorders

Studies the various theories, programs, and approaches dealing with emotional disturbance. Emphasizes the role of the educator as it relates to the therapeutic management of individuals and groups displaying problems in socio-emotional development. Discusses parent-teacher interaction.

CRS 3405 Group Dynamics

Emphasizes understanding group growth, behavior, and action fundamental to developing solutions to the complex developing of group life. Teaches students to learn to examine their strengths and weaknesses, to examine group leadership styles, to become alert to new ideas and actions, to discover the pulse of a group, and to analyze reasons for one group's productivity and another's nonproductivity.

CRS 3407 Case Conferences: Individuals with Special Needs

Serves as a seminar in connection with the student's practicum. Examines and discusses case presentations by outstanding resource persons. Requires students to make their own case presentations to the seminar.

CRS 3408 Socio- and Psychodynamics of Family Life

Considers the internal and external dynamics of family life and the significance of such dynamics to the mental health of handicapped individuals and their families. Emphasizes the impact of disability on family functioning and integration. Explores approaches to working with parents of special needs groups from psychodynamic, social learning, and systems viewpoints.

CRS 3410 Review of Current Methodology and Research in Learning Disorders

Offers an advanced course to help develop the following competencies in relation to educating learning-disordered individuals (early childhood through adulthood): use of task analysis and learning style to develop comprehensive individual education plans; use of current research to evaluate techniques of intervention (for example, behavior modification and drug therapy

for hyperactive children); review of current research to evaluate assessment techniques (for example, effectiveness of available tests for learning disorders; ability to administer, score, and interpret tests useful in identifying learning disabilities; use of prescriptive techniques and materials for learning disabilities). May individualize selection of topics within competency areas for students, based on previous course work and experience. *Prereq.* CRS 3401.

CRS 3412 Psychology of Individuals with Special Needs

Studies the social and emotional adjustment of the handicapped and of the psychological significance of cognitive, sensory, and motor variations. Evaluates relevant legislation, the effects of limitations imposed by attitudes of society, the attitudes of individuals toward their handicaps, and the effect of the handicap itself. Discusses implications for educational programs and life span management. This course should be among the first taken in the Special Education sequence.

CRS 3415 Assessment in Special Education

Offers a field-based course that gives students the opportunity to learn to administer selected norm-referenced tests for special needs populations, determine which tests will yield the most information in a variety of case studies, and interpret data from a minimum of four norm-referenced test batteries.

CRS 3416 Diagnostic Prescriptive Teaching

Offers a field-based course that focuses on the understanding, development and implementation of individualized educational programs, including development of criterion-referenced tests, tasks analysis, annual goals, and short-range objectives; educational strategies and their application in classroom management; adaptation and selection of materials and strategies in various academic areas; perceptual-motor skills; and social-emotional interventions.

CRS 3417 Early Childhood Learning Problems: Identification and Program Development

Evaluates informal and formal screening and assessment procedures suitable for an early childhood population. Requires students to work with young children in order to acquire experience with screening and assessment techniques. May use the resulting information to develop programs to meet the needs of individual children.

CRS 3418 Special Education for Gifted Children

Considers identification, characteristics, and problems of gifted, creative, and talented children and youth. Emphasizes administrative and instructional adjustments needed to provide for this group of exceptional children.

CRS 3419 Practicum in Special Education: Fieldwork

Requires students to spend 250 hours in appropriate special education settings. Placements may be for one or two quarters. Requires attendance at seminars.

CRS 3420 Practicum in Special Education:**Student Teaching**

Requires students to spend a minimum of 300 hours in a placement that is appropriate for the certification sought (moderate or severe). Requires placement "in the role of" and "at the level of" certification sought (moderate, N-9 or 5-12; severe, all levels). Requires attendance at seminars.

CRS 3424 Etiology and Development of Special Needs

Explores factors that primarily affect deviations in cognitive, motoric, emotional, and physical development. Uses understanding of these factors to discuss multidisciplinary life-management issues. Discusses psychobiological, psychodynamic, and learning theory approaches and relates to problems of lifespan management.

CRS 3426 Seminar in Mental Retardation

Studies research in the field and its implications for teaching. Studies and evaluates intervention strategies.

CRS 3427 Seminar: Neuropsychology of Learning and Behavior Disorders

Through critical review of the literature, analyzes and discusses varied neuropsychological interpretations of the nature of learning and behavior disorders. Topics include biochemical and physiological correlates, cognitive and perceptual factors, genetic and maturational variables, hemispheric specialization, and implications of drug studies. Considers implications of the above for educating and serving special needs individuals as useful to administrators, teachers, counselors, reading specialists, school psychologists, and those in allied health fields. Expects students to give a presentation in an area related to the seminar topic. *Prereq.* CRS 3401.

CRS 3428 The Severely Handicapped

Reviews causes of handicapping conditions and considers the implications of severe multiple handicaps in home, educational, and community settings. Offers students a chance to develop a case study of a severely handicapped person in conjunction with reviewing relevant literature, visiting community facilities, and interviewing a family with a severely handicapped member.

CRS 3429 Assessment and Program Development for the Severely Handicapped

Includes observation of severely handicapped persons in the classroom and community; demonstration of evaluation and assessment techniques; and analysis of developmental, educational, and rehabilitation plans for severely handicapped persons.

CRS 3430 Behavior Management

Helps students design and implement behavior management programs for special needs children, youths, and adults. Synthesizes the various theoretical aspects of behavior modification in various field-based projects. Allows students to work with learning disabled, emotionally disturbed, or mentally retarded individuals to pinpoint target behaviors, chart baseline and intervention data, use appropriate reinforcement schedules

and reinforcers, and evaluate necessary program changes. Serves as field-based course required for all Moderate and Severe Special Education majors and recommended for students in School Psychology. *Prereq.* *Appropriate background in learning theory.*

CRS 3433 Introduction to Rehabilitation

Provides an overview of an orientation to the field of rehabilitation, including its historical development, legislative involvement, psychological implications, and sociological dimensions. Emphasizes coordinating and integrating services as they relate to the field of rehabilitation as a community process.

CRS 3434 Principles of Medical Rehabilitation

Explores the wide spectrum of disabilities that could profit from rehabilitation, including orthopedic, neurological, medical, surgical, and mental disabilities. Presents basic principles of medical rehabilitation that administrators should know. Discusses psychological aspects of disability.

CRS 3435 Program Development

Deals with program development for the physically handicapped, mentally retarded, emotionally disturbed, aging, welfare populations, youthful offenders, culturally disadvantaged, and other special community groups. Emphasizes the administrative involvement in developing and supporting the diagnostic, evaluative, counseling, and placement procedures used in such rehabilitative programs. Explores issues involving clinical program planning.

CRS 3436 Organization and Administrative Theory

Examines the body of conceptual knowledge regarding organizational and administrative theory. Examines formal and informal organizations, organizations as social systems, status and role concepts, leadership in organizations, power structure, relationships to authority, decision making, and communication in and between organizations.

CRS 3437 Community Planning

Presents what administrators need to know about community planning to develop programs in their areas. Examines basic principles of community planning, organization, and dynamics, as well as interdisciplinary relations. Studies examples of community planning from different agencies and the referral process among these agencies.

CRS 3439 Social Welfare and Rehabilitation

Attempts to acquaint administrators, counselors, and other human services personnel with the broad field of social welfare. Reviews the historical background of the relationship between vocational rehabilitation and social welfare and the more recent developments in the relationship of these fields.

CRS 3440 Program Evaluation

Emphasizes administrative research, program evaluation, and grantsmanship. Gives students the opportunity to develop a research design on some aspect of administration and carry out the necessary research operations involved.

CRS 3442 Fiscal Policy and Management 1

Introduces the concept of fiscal and managerial control. Covers accounting and budgetary procedures, need surveys, goal-setting practices, recruitment, staffing, training, professional development, caseload management, program planning, utilization of research, leadership patterns, performance appraisal, and external relationships. May use case method approach in classroom exercises.

CRS 3443 Administration of a Sheltered Workshop

Explores special problems of administering a sheltered workshop, such as community planning, work evaluation, job training, labor relations, contracting, production, and occupational placement.

CRS 3444 Fiscal Policy and Management 2

Examines understanding the fiscal management of the typical rehabilitation setting, including basic rehabilitation agency accounting, planned program budgeting, disbursements, cost analysis, contracting, taxation, forecasting, and funding. Covers the implication of data processing for fiscal management. Assigns special problems.

CRS 3445 Legal Aspects of Rehabilitation and Special Education

Sensitizes rehabilitation administrators, special educators, rehabilitation counselors, and other personnel to the impact of legislative developments upon the field of rehabilitation and special education. Emphasizes understanding the legal implications for rehabilitation of the latest Vocational Rehabilitation Administrative Amendments, workmen's compensation laws, eligibility determination criteria, and Social Security Amendments. Covers latest federal and state special education legislation.

CRS 3446 Occupational Placement

Studies the dynamics of moving the rehabilitation client into the world of work within the framework of the specific community structure. Considers development of facility in use of resource materials in occupational information, job description and analysis, performance appraisal, training, and vocational assessment. Discusses and analyzes the personnel point of view of the handicapped individual and develops more effective placement practices.

CRS 3448 CAGS Rehabilitation Practicum

Students are usually assigned to rehabilitation agencies where they are expected to spend 250 hours under appropriate supervision. A seminar with faculty members is conducted twice each quarter.

CRS 3449 Psychological Problems of Disability

Offers an advanced course in psychopathology as it relates to the impact of disability on personality. Studies in depth the moderately and severely handicapped from the viewpoint of psychosocial factors, interpersonal relationships, and cognitive versus noncognitive functioning in those with motor and sensory disabilities; problems of dependency and motivation; role of psychosomatic factors. Discusses the role of treatment and rehabilitation.

CRS 3450 Administrative Problems in Rehabilitation

Offers a seminar designed to analyze, in depth, critical issues and selected rehabilitation problems. Highlights operations and systems research as applied to rehabilitation. Uses institute research studies and studies available through social and rehabilitation services, completed research, and demonstrative projects.

CRS 3451 Essentials of Case Management and Supervision

Considers the relationship between case management and casework supervision. Topics include the dynamics of the communication process, decision making, conflict, resolution and compliance, management of resources external to the organization, structural and functional analysis of supervisory process, and caseload management.

CRS 3452 Rehabilitation of the Alcoholic and Drug Dependent

Studies comprehensive factors, including the nature of etiology dynamics involved in alcohol and drug dependency; techniques for evaluation; and rehabilitation administration, planning, and treatment.

CRS 3455 Critical Issues in Rehabilitation Administration

Explores and discusses the highly problematic issues of today's field. Among these issues are the breadth of the concept of disability, appropriate training sequences for the various rehabilitation disciplines, resolution of conflict over role overlap among disciplines, appropriate models for service delivery systems. The most current and relevant research may be brought to bear upon these areas, as well as knowledge from the reservoir of experience of instructors, visiting experts, and the student participants themselves. Students will be exposed to the issues as they exist in the profession and in the community. A theoretically oriented frame of reference will be brought to bear upon problems when feasible.

CRS 3460 (2 QH), CRS 3461 (3 QH), CRS 3462 (3 QH) Rehabilitation Administration Practicum, 1, 2, and 3

Assigns students to a variety of rehabilitation agencies for their practicum experience. Considers problem solving relevant to experiences encountered in internship. May include a seminar regularly conducted by a senior faculty member in conjunction with the practicum experience. Offers students an opportunity to share their fieldwork experiences and resolve problems in rehabilitation which are connected with their field placements.

CRS 3477 Evaluation of Deaf Rehabilitation Clients

Explores methods and techniques of psychological and vocational evaluation for deaf rehabilitation clients, including evaluation of client biographical characteristics, evaluation interview, and psychometric assessment. Required of all students in the deafness specialization of Rehabilitation Counseling Program. *Prereq.* CRS 3501 and SLA 3644.

CRS 3500 Foundations in Professional Psychology and Human Services

Provides a philosophical and theoretical background for beginning graduate students in counseling. Sharp-

ens the "self as instrument" through study and discussion of established theories of helping related to one's personal value system and through self-exploration and increased self-understanding in heretofore unexplored personal areas; introduces students to the broad spectrum of professional helping service areas with the intent of clarifying the students' professional roles; and begins to promote the development of a professional identity as a psychological helping professional.

CRS 3501 Psychological Testing

Discusses the principles and problems of psychological testing as applied to the work of the counselor. Considers technical concepts applicable to the use, understanding, and interpretation of test scores. Gives students the opportunity to become familiar with the most frequently used tests of intelligence, aptitude, achievement, interest, and personality. Evaluates tests for use in diagnosis and in understanding human behavior, with emphasis on their interpretation.

CRS 3502 Vocational Development and Occupational Information

Deals first, with theories about the ways in which individuals make decisions concerning their choice of vocation and second, with the kind of data needed to assist people with these decisions. Considers these requisite data in the relationship of social and economic change to occupational trends, the classification and description of occupational fields, methods of collecting, evaluating, filing, and disseminating vocational information, and the role of the counselor in fulfilling these functions.

CRS 3503 Counseling Theory and Process

Provides the student with a basic cognitive understanding of several major theoretical approaches to counseling. Helps students to become familiar with a wide range of individual counseling strategies, to develop listening, understanding, and communications skills, and to further probe their own self-understanding as counselors. Discusses and simulates these skills and understandings in the context of a variety of settings with a variety of clients. Uses role playing, case material, and audio and video materials. Open to degree and nondegree students with permission of the instructor during winter and spring quarters.

CRS 3507 Group Counseling

Introduces theories, principles, and techniques of counseling with groups of individuals at different levels of development and for varying purposes. Involves students in a genuine group counseling experience in order to understand the phenomenon of group experience. *Prereq.* CRS 3503 or permission of instructor.

CRS 3508 The College Student and the Campus

Examines the relationship between college students' behavior and their environment, with focus on students' rights, their social-emotional developmental concerns, and their search for identity. Examines the impact of societal forces and nontraditional patterns of learning on college curriculum options and discusses varying concerns of personnel services in different types of college climates, including the community college. Examines current issues in higher education as they relate to services offered to students.

CRS 3517 Consultation Seminar

Offers a review of various consultation models, including behavioral consultation, process consultation, and systems consultation. Examines current research in the field of counseling consultation. Emphasizes the development of a personal consultation style and enhancement of consultation skills.

CRS 3518 Advanced Vocational Techniques

Focuses on career counseling issues, didactic instruction in career development theory, leadership of career development groups, and vocational/leisure counseling. Includes such learning activities as case studies, audio/video tapes in career counseling sessions, and class discussion of problems and their solutions.

CRS 3519 School Adjustment Casework

Offers students an opportunity to learn how to identify behaviors that interfere with a student's performance in school. Focuses on psycho-social evaluation skills and reviews therapeutic techniques for promoting insight and behavior change. Introduces the skills needed to organize and participate in teacher conferences and to act as a mental health consultant to teachers and parents. Review related areas of cultural and class factors, research in school phobias, abuse and neglect, drugs and alcohol, self-esteem, and special education laws and strategies.

CRS 3525 Family and Parent Counseling

Focuses on a conceptual understanding of family systems theory and its application to and implications for family counseling. Presents structural, communicative, and strategic approaches to marital, parent, and family counseling as the family is studied as an interactional system, as a seedbed of distress and health. Provides opportunity to become familiar with family assessment, counseling skills, and strategies. *Prereq.* CRS 3503.

CRS 3526 Seminar in Student Personnel Work

Explores, through case simulation and role plays, the legal, philosophical, and management theory bases for decision-making in the process of developing and administering student personnel programs in higher education. Emphasizes translating theory into practice via lectures, discussions, and the analysis of case study materials.

CRS 3527 Counseling Strategies for Children and Adolescents

Intended primarily for students who will counsel in school settings or other settings emphasizing work with children and adolescents. Considers a broad range of approaches, including but not limited to behavior modification, Adlerian, and Reality Therapy strategies. Emphasizes the development of strategies designed to help alleviate typical school-related and developmental problems such as nonachievement, decision making, negative self-identity, and disruptive behavior. Considers the counselor's role as a consultant to teachers, parents, and administrators in effecting positive behavior change. *Prereq.* CRS 3503.

CRS 3528 Vocational Counseling Strategies

Examines the individual's role expectations in the world of work from a human development perspective, and a systematic program to foster self-awareness will

be set forth. Views vocational counseling as dealing with the entire individual, including his or her values, underlying psychological needs and drives, and the influence of the environment on his or her level of development and career awareness. Includes counseling with females and nonachievers, the decline of the work ethic, community resource development, job placement, and information giving as a perceptual process. Intended for a variety of client populations from adolescence through adulthood. *Prereq.* CRS 3503.

CRS 3529 Rehabilitation Counseling Strategies

Emphasizes the roles and functions of the rehabilitation counselor, relevant issues in the field, and an overview of the rehabilitation process. Examines special problems and techniques of counseling with the disabled (physical, mental, and behavioral disorders) through case studies and role playing. Covers disability in the context of social deviance and psychosocial approaches to understanding human behavior, including self-concept, social role theories, and rational-behavioral approaches. *Prereq.* CRS 3503. *This prerequisite is waived for Rehabilitation Administration majors.*

CRS 3550 Psychological Counseling Strategies

Focuses on a variety of change strategies appropriate for older adolescents and adults. Intended for the student working with client populations in mental health settings and college counseling centers. *Prereq.* CRS 3503.

CRS 3551 Case Studies in Marriage and Family Counseling

Presents an advanced-level course for students with previous experience or preparation in marriage and family counseling. Emphasizes the preparation of case studies of family and marriage histories and current functioning; the design of service, counseling, and referral programs based upon comprehensive studies of needs and resources; and the practice of counseling strategies through role playing, taped interviews, and progress reports of current counseling activities. *Prereq.* CRS 3525.

CRS 3532 Seminar in School Psychology

Provides an intensive analysis of philosophical, technical, and school administrative issues contributing to the professional identity and consultative function of the psychologist in an educational milieu. Uses simulations, case studies, and research projects to study these issues. *Prereq.* Permission of instructor.

CRS 3533 Psychoeducational Prescriptions

Recommended for all school counseling majors and required of all school psychology majors. Provides training and supervision in synthesizing data on a student's cognitive, affective, and interpersonal needs with educational plans which are based directly on that data; may be implemented in the school setting; and meet the 766, PL94-142 criteria for such plans.

CRS 3534 Individual Intelligence Testing

6 QH

Offers preparation to administer, score, and interpret the Stanford-Binet Intelligence Test, the Wechsler Adult Intelligence Test, and the Wechsler Intelligence Scale for Children. Considers the theories of intelli-

gence upon which the tests are based and the use of the tests in educational and clinical settings. Requires students to administer, score, and interpret tests, including some from each of the three tests covering in the course. *Prereq.* CRS 3501.

CRS 3535 Seminar in Contemporary Issues in Counseling

Offers intensive study of a selected topic in counseling such as multicultural counseling, feminist therapy, child therapy, or adult development. May include a review of the literature, skill building, action projects, or critical analytical papers.

CRS 3536 Advanced Group Counseling

Follows CRS 3507 but emphasizes developing skill in leadership at a variety of ages. Pays greater attention to relevant readings and research on group process and group dynamics. *Prereq.* CRS 3507.

CRS 3537 Seminar in Counseling Supervision and In-Service Education

Considers theory and practice of the supervisory process as it applies to the evaluation of counselor effectiveness and professional development. Requires theory readings, discussions, role playing, and plans for in-service staff development, but the major activity of the course involves the use of audio and videotapes of actual supervisory sessions conducted by class members (access to actual or simulated supervision clients is an assumed requirement). *Prereq.* Master's degree in counseling or permission of instructor.

CRS 3538 History and Systems of Psychology

Offers an advanced-level counseling course required of all counseling psychology students in the master's, CAGS, and doctoral programs. Designed to expose students to the major historical ideas in western culture that underlie modern psychological theories, methods of human behavior change, and concepts of science. Reviews fundamental steering concepts to give students deepened perspective on the state of contemporary counseling psychology by showing how the historical past has shaped current thought, and to suggest possibilities for development in psychology. *Prereq.* CRS 3530.

CRS 3539 Contemporary Theories of Psychotherapy

Required of all CAGS students. Continues the in-depth focus on the conceptual clinical elements of contemporary psychoanalytic, cognitive, social learning, existential and systemic theories of personality and behavior change. Includes selected readings, lectures, and student discussion. Aims to develop an appreciation for issues involved in the evaluation and future directions of contemporary theoretical schools, and to consider which types of therapies may be suitable for certain types of clients at specific periods of their lives, as well as to critically examine the gender, class, and culture adequacy of theory. *Prereq.* CRS 3538.

CRS 3540 Advanced Psychodiagnostics

Offers an advanced course in psychodiagnostic testing, focusing on the Rorschach test. Teaches the administering, scoring and the basics of interpreting this test, using the Exner scoring system. Integrates Rorschach data with data from other sources, such as personal

history data and other projective tests. Trains students in providing clear, pertinent feedback and recommendations. Assumes a rudimentary knowledge of the theory and practice of psycho-diagnosis. *Prereq.* CRS 3501, CRS 3534, and CRS 3541.

CRS 3541 Psychodiagnostic Measures

Offers an advanced-level course in clinical assessment. Places heavy emphasis on differential diagnosis and personality description using data from a variety of sources—interviewing, case histories, and objective and projective testing. May include the California Psychological Inventory, Minnesota Multiphasic Personality Inventory, Bender-Gestalt and Sentence Completion Tests, and Draw-A-Person Test. Requires students to administer and interpret psychological test data and to report their findings in a psychological report. *Prereq.* CRS 3501 and CRS 3534.

CRS 3551 Legal, Ethical, and Professional Issues in Counseling and Mental Health

Provides a systematic orientation to the moral, legal, ethical, and professional issues found by mental health practitioners in their teaching, research, and practice. *Prereq.* Doctoral standing or permission of instructor.

CRS 3552 Cross-Cultural Counseling

Helps students develop beliefs/attitudes, knowledges, and skills that will contribute to their becoming culturally sensitive in their counseling and assessment practice. *Prereq.* CRS 3503 or permission of instructor.

CRS 3553 Human Neuropsychology 1

Explores brain/behavior relationships and acquaints students with the language and frame of reference of neuropsychology. Introduces neuroanatomy, the topography of the cerebrum, brain stem, and cortospinal system. Covers different theories and approaches to understanding brain/behavior relationships and significant clinical disorders such as alcoholism, aging, epilepsy, language deficits and apraxias, and last, memory disorders and learning disabilities. *Prereq.* CRS 3501 and CRS 3534.

CRS 3554 Human Neuropsychology 2

Describes neuropsychological assessment of adults and children, a rationale for undertaking such an evaluation, the sorts of questions or topics that can be addressed, and appropriate tests and techniques. Covers topics such as laterality, effects of psychiatric disorders, and childhood disorders through a critical review of the literature and research. *Prereq.* CRS 3553.

CRS 3555 Child Psychotherapy

Provides students with a basic understanding of child development, psychopathology, and modes of psychotherapy with children. Addresses the importance of working with parents and with school systems and, through class discussions and readings, give students a sense of how to consult with parents and schools. *Prereq.* CRS 3503 or permission of instructor.

CRS 3556 Feminist Therapy

Introduces the psychology of women, sex roles, gender socialization, and feminism at an intermediate level. Emphasizes the analysis of traditional personality

theory, psychopathology, and treatment from a feminist perspective. *Prereq.* CRS 3501, CRS 3503, and CRS 3530, or permission of instructor.

CRS 3557 Counseling Adults and Families over the Life Span

Utilizes a combined didactic and seminar presentation to develop understanding of life span biopsychosocial issues in adulthood and the implications for counseling adults as they pass through the stages of human development and reciprocal impacts of individual, family, and career. Gives special attention to gender, class, racial, and cross-cultural variables affecting individual and family functioning in larger social systems. Studies clinical interventions in the context of contemporary psychological theory and research. *Prereq.* CRS 3503 and CRS 3525.

CRS 3558 Doctoral Seminar in Counseling Psychology

Seeks to prepare doctoral students to critically analyze their discipline and profession at an advanced level. Identifies and analyzes current research findings, professional trends and disciplinary assumptions. *Prereq.* Permission of adviser.

CRS 3559 Community Psychology

Introduces the history and conceptual base of community psychology. Discusses crisis theory, prevention, and ecological systems theory. Presents consultation skills, model community programs, and women's and minority issues. *Prereq.* Open to doctoral and CAGS students in counseling psychology and school psychology, or permission of instructor.

CRS 3560 (2 QH), CRS 3561 (3 QH), CRS 3562 (3 QH)
Counseling Psychology Practicum 1, 2, 3

CRS 3563 (2 QH), CRS 3564 (3 QH), CRS 3565 (3 QH)
Industrial Practicum 1, 2, 3

CRS 3566 (2 QH), CRS 3567 (3 QH), CRS 3568 (3 QH)
School Counseling Practicum 1, 2, 3

CRS 3569 (2 QH), CRS 3570 (3 QH), CRS 3571 (3 QH)
Student Personnel Practicum 1, 2, 3

CRS 3572 (2 QH), CRS 3573 (3 QH), CRS 3574 (3 QH)
Rehabilitation Counseling Practicum 1, 2, 3

Offers a supervised counseling experience extended over the academic year. In the fall, emphasizes small group seminars dealing with counseling and other related matters. In the winter and spring quarters concentrates on the supervised counseling assignment. Assigns practicum settings according to the student's major area of concentration. Requires students to make themselves available a minimum of two days per week during the academic year (October to June) for placement in a field setting. Stresses materials germane to the student's major and meets a total of twenty-four times during the year. Each practicum must be successfully completed prior to commencing the next. *Part-time students must submit an application for practicum (available from the department) by April 1, for approval to enroll in the practicum the following fall quarter. Prereq.* CRS 3503 (may be taken concurrently with the beginning of practicum).

CRS 3575 (2 QH), CRS 3576 (3 QH), CRS 3577 (3 QH)**School Psychology Fieldwork 1, 2, 3**

Presents the first phase of a two-year sequence of supervised fieldwork required for school psychologist certification. Places students in an N-12 school system working under the supervision of a certified school psychologist. Continues for two days a week across the academic year from September to June. Allows students to perform psychological evaluations and participate in other appropriate activities. Includes seminars that meet for twenty-four sessions during the year to provide skill training and discuss role functions. Gives students one hour of supervision per week from the field site supervisor. *Students must submit an application for a fieldwork placement by April 1 for approval for the course that begins in the following fall quarter. Prereq. Approval of adviser.*

CRS 3578 (2 QH), CRS 3579 (3 QH), CRS 3580 (3 QH)**School Psychology Fieldwork 4, 5, 6**

Involves the second phase of a two-year sequence leading to eligibility for application for school psychologist certification. Assigns students to a different N-12 grade placement from the first experience to provide a diversified experience. Offers placement for two days per week from September to June. Includes seminars that meet twenty-four times across the academic year and consist of case presentations, skill and strategy training, and discussions of case management. Provides for students to work under and receive one hour of supervision from their certified school psychologist site supervisor. *Students must submit an application for fieldwork by April 1 for approval to enroll in the fieldwork course the following fall quarter. Prereq. CRS 3575, CRS 3576, and CRS 3577.*

CRS 3581 (2 QH), CRS 3582 (3 QH), CRS 3583 (3 QH)**Advanced Fieldwork 1, 2, 3**

Required for all CAGS students. Involves fieldwork placement consistent with students' major professional goals and/or the settings in which they intend to work. May extend across the academic year from September to June and require a minimum of two days per week, or the equivalent, in the fieldwork setting. Includes seminars that will meet, subject to change, on alternate weeks with additional individual supervision on campus. Provides supervision in the field setting. Requires all quarters to be completed before credit will be given for the course. *Prereq. Counseling practicum or equiv. in experience.*

CRS 3612 Psychoeducational Assessment and Screening of Preschoolers

Focuses on the psychological and educational assessment of preschoolers as conducted by school psychologists. Discusses history, issues, and current status of preschool assessment. *Prereq. Open to CAGS students in school psychology who have completed introductory assessment course, or permission of instructor.*

CRS 3615 Student-Staff Development for College Student Personnel

Explores a variety of models for understanding student and staff development in student personnel services. Focuses on assessing developmental needs and

designing, delivering, and evaluating educational programs which address those needs. Gives special attention to understanding diversity within student and staff populations. Examines significant life experiences that affect individual development patterns including race and ethnicity, gender, age, disability, and sexual orientation. *Prereq. CRS 3508.*

CRS 3620 Fundamentals of Human Resource Counseling

Develops students' understanding of human resource counseling as a rapidly developing area of applied Psychological work in a variety of organizational settings. Considers human resource counseling as a potentially significant social movement for facilitating employee well-being and occupational competence. Surveys basic applied psychological practices employed in human resource development programs. Considers future trends in human resource program development as well as the continuing educational needs of professional counselors. *Prereq. CRS 3501 and CRS 3503.*

CRS 3630 Workshop in Career Development

Focuses on planning and implementing career development programs for adolescents and adults in schools, colleges, and community-based agencies. Introduces theoretical material on life stages, vocational development, and justifications for career education. Emphasizes the practical techniques presented by successful practitioners. Requires students to develop a program plan for "backbone" implementation.

CRS 3631 Workshop School Adjustment Practice

Focuses on participants' own experiences in work with children and families, the school system, and the community. Uses the case study as problem-solving approach to analyze, explain, and remediate a "presenting problem" within a diagnostic-prescriptive framework. *This course is designed for school adjustment counselors who are currently employed in a Massachusetts school system or similar youth workers in other schools or agencies.*

CRS 3632 Workshop in Peer Counseling in Schools and Colleges

Explores the philosophy and techniques of training students as counselors for other students. Investigates methods of introducing peer counseling programs to schools and colleges. Offers techniques for presenting the concept to administrators. Provides experience in the group model of peer-counselor training. Requires a research paper that directly applies peer counseling to student's area of professional interest.

CRS 3633 Workshop in Reality Therapy

Offers practice in applying reality therapy principles and gives assistance in developing a plan to implement principles in professional work. *Designed for teachers, administrators, and human service professionals in health, including counselors, psychologists, nurses, and therapists.*

CRS 3800 Directed Study

Provided for the student whose unique academic needs or interests cannot be adequately satisfied in any of the scheduled courses of the department. *Not available to special students. Prereq. Approval of the*

chair of the department and of the director of the graduate school. Approval forms must be submitted during the quarter prior to registration for the directed study.

CRS 3801 Thesis 8 QH

Involves a research activity that may be selected by the student in lieu of two courses (8 QH), with the approval and recommendation of the adviser.

CRS 3803 Institute in Counselor Education

(See general institute description on page 74.)

CRS 3804 Institute in Rehabilitation Administration

(See general institute description on page 74.)

CRS 3805 Institute in Special Education

(See general institute description on page 74.)

CRS 3806 Workshop in Counselor Education

(See general workshop description on page 74.)

CRS 3807 Workshop in Rehabilitation Administration

(See general workshop description on page 76.)

CRS 3808 Doctoral Dissertation

Prereq. Admission to candidacy in the Doctor of Education degree program.

CRS 3850, CRS 3851, CRS 3852, CRS 3853, CRS 3854, CRS 3855 2 QH each

Internship in Counseling Psychology 1, 2, 3, 4, 5, 6

Required of all doctoral students in counseling psychology. Determines field placement by Internship Com-

mittee based upon individual professional goals and experience. Requires a minimum of twenty hours per week for eighteen months for a total of 1,500 clock hours in the internship setting. Provides for students to register for CRS 3850 through CRS 3855 for a total of twelve quarter hours. Involves campus meetings held at least eight times a quarter on a group basis for all interns. Provides on-site supervision for at least two hours per week on an individual basis. *Prereq. CRS 3581 or equiv. in experience approved by the Internship Committee.*

CRS 3856, CRS 3857, CRS 3858 4 QH each
Internship in Counseling Psychology 1, 2, 3

Required of all doctoral students in counseling psychology. Determines field placement by Internship Committee based upon individual professional goals and experience. Requires a minimum of forty hours per week for nine months for a total of 1,500 clock hours in the internship setting. Provides for students to register for CRS 3856 through CRS 3858 in subsequent quarters for a total of twelve quarter hours. Involves campus meetings held at least eight times a quarter on a group basis for all interns. Provides on-site supervision by a supervisor from the field site for at least two hours per week on an individual basis. *Prereq. CRS 3581 or equiv. in experience approved by the Internship Committee.*

Education

ED 3300 Psychology of Learning

Compares basic principles of learning, acquisition, retention, and transfer. Considers the applications of these principles in a variety of areas, for example, child rearing, schooling, rehabilitation. *Suggested prereq. A course in psychology.*

ED 3301 Psychology of Thinking

Surveys the processes involved in cognitive organization and functioning. Focuses on reasoning, concept attainment, and problem solving. Reviews strategies for enhancing cognitive functioning. *Suggested prereq. A course in psychology.*

ED 3302 Psychology of Personality

Considers the personality theories of Freud, Jung, Adler, Sullivan, Horney, Cattell, Allport, Rogers, and other approaches, including the psychosomatic of Alexander and the work of Reich. Examines theories in depth for ways that contribute to an understanding of dynamic factors in personality formation. Compares theories and theorists for a greater understanding of strengths and weaknesses. Discusses social, cultural and philosophic questions. Considers implications of some of the ideas and theories for the therapeutic process. *Suggested prereq. At least one course, and preferably more, in psychology.*

ED 3303 Theories of Developmental Psychology

Reviews representative developmental theories. Compares and analyzes key aspects of these theories with a focus on educational implications. *Instructor permission required.*

ED 3304 Child Psychology

Surveys principles of child development from the prenatal period through preadolescence. Reviews physical, cognitive, language, social, and personality development in the context of relevant theory. Considers educational implications.

ED 3305 Adolescent Psychology

Examines social, emotional, and intellectual development in the adolescent years. Studies problems in family relationships and in adolescents' social environment as well as their adjustment in school.

ED 3306 Abnormal Psychology

Presents a historical overview that leads to contemporary views on how human personality becomes disordered and maladaptive. Emphasizes the development of psychopathology during the course of development, including a perspective for viewing the economy of psychological deviations. Considers neuroses, transient states, character disorders, sexual deviations, psychophysiological reactions, drug and alcohol addictions, and psychotic reactions, each with a

clinical picture, typical course, and outcomes. Considers current methods of diagnosis and treatment. *Prereq.* *Permission of instructor.*

ED 3307 Adult Psychology

Explores the three major areas of adulthood (young adulthood, middle age, and old age) in a context of research findings, academic knowledge, and clinical findings.

ED 3308 Seminar in Child Development

Presents a seminar course with emphasis on discussion of critical issues in child development. Allows for students to select topics, review and evaluate research, examine the relevance of the research to educational theory and practice, and present their findings and conclusions to the seminar. *Prereq.* *A course in child psychology or human development.*

ED 3309 Seminar in Adolescent Development

Presents a seminar course with emphasis on discussion of major problem areas facing the adolescent in our society. Stresses social and emotional development. Includes a survey of research. *Prereq.* *A course in adolescent psychology or human development.*

ED 3310 Personality and Social Structure

Considers human behavior from a combined psychodynamic and sociological point of view, with special emphasis on socialization and the relations between the individual and the collectivity. Examines the integration of relevant theories from psychology, sociology, and anthropology. *Suggested prereq.* *A course in sociology, cultural anthropology, or social psychology.*

ED 3311 Sex Roles in Education

Identifies and examines some of the major issues related to sex roles in both the formal and informal educational systems of our society. Topics include development of sex role patterns in the home and preschool and through children's books, games, and television programs; life for boys and girls in the elementary and high school classroom; sex bias in counseling and in vocational guidance and training; changes in traditional family roles and occupation hierarchies; assets and liabilities of coeducational and single-sex education. May also allow students, in small groups, to explore their own sex role attitudes and the strategies they use to socialize young people.

ED 3312 Communications Theory

Introduces communications theory, covering models of the communication process, attitude changes, information, innovation, dissemination and flow, communication modalities, and language processing.

ED 3320 Sociology of Education

Considers the functioning of educational institutions in their social and cultural milieu will be examined from anthropological and sociological perspectives: the school as a social system; influence of the stratification system, youth cultures, and racial antagonisms upon the educational enterprise.

ED 3321 Educational Anthropology

Examines schooling as a particular variety of socialization, with special attention to characteristics of societies that rely heavily on formal instruction, contrasted with less deliberately patterned techniques of child rearing. Includes readings that will be mainly cross-cultural, ethnographic, and historical.

ED 3324 Comparative Education

Introduces education in other nations and exploration of its relationships with the political, economic, social, and cultural milieu. Considers selected countries in Western and Eastern Europe, South America, and Africa.

ED 3325 History of Education

Explores some of the historical roots of contemporary educational theory and practice with a focus on selected aspects of educational history from antiquity to the present. Utilizes knowledge gained for the development of a personal educational position.

ED 3326 Topics in the Philosophy of Education

Studies the basic assumptions underlying statements of educational content, process, and aims. Selects materials to be subjected to philosophical analysis from educational and philosophic writings according to themes (for example, authority and freedom, "growth" as an educational objective, the nature of educational relationships). Varies from quarter to quarter, depending on the concerns and interests of students and instructor. Includes brief lectures, mostly discussion.

ED 3327 Seminar in Contemporary Issues in American Education

Discusses selected issues in contemporary American education such as school desegregation, compensatory education, learning problems of the disadvantaged, professionalization of teachers, etc. Reviews relevant research and opinions. The topic or topics of the seminar will be announced in the registration materials distributed in advance of that quarter.

ED 3328 Education and Equality

Investigates the reciprocal relationship between American educational institutions and the equality-inequality dimension of American social structure. Discusses both the traditional view, which celebrates the American public school as a triumph of equalitarianism, and the revisionist view, which emphasizes inequalitarian consequences of American educational practice.

ED 3340 Introduction to Educational Statistics

Studies basic descriptive statistics for measurement and research. Topics include use of statistical notation, measures of central tendency and variability, probability and sampling techniques, theoretical distributions, linear regression and correlation, and an introduction to statistical inference. *This course, or completion of a statistics proficiency examination, is required for admission to ED3342.*

ED 3341 Intermediate Educational Statistics

Explores statistical inference of normal populations and discrete data; estimation; testing of hypotheses;

multiple correlation; analysis of variance and covariance; contingency; the chi-square test and other non-parametric tests. Emphasizes application in educational research. *Prereq.* Successful completion of the statistics proficiency examination; satisfactory completion of ED 3340 or permission of instructor. This course must be completed prior to doctoral candidacy.

ED 3342 Research Design in Education

Introduces scientific methods of research in education and related fields. Stresses critical reading and understanding of research literature, formulating research hypotheses, constructing a research proposal, and carrying out an individual or group project. Must be included among the first six courses taken by each student. *Prereq.* Satisfactory completion of the statistics proficiency examination or satisfactory completion of any graduate-level statistics course offered by Boston-Bouvé College (Students wishing to make arrangements to take the proficiency examination should call 617-437-3302.)

ED 3343 Advanced Research Design

Focuses on methodologies for collecting, interpreting, and evaluating data and deals with biases encountered in the data-collection process. Topics include data collection and interpretation, use of sampling, analysis of variance, covariance, multiple regression, multivariate procedures, and advanced topics in scaling, semantic differential methodology, questionnaire design, interview methodology, and evaluative criteria. Requires students enrolling for this course to design and complete a proposal on this design for the conduct of a research project, which may be carried out as part of a research on either the master's or doctoral level. *Prereq.* ED 3341, *equiv.*, or permission of instructor.

ED 3344 Nonquantitative Research Methods in Education

Considers nonquantitative research methods in the human development professions. Topics include problem formulation, location and selection of data, authenticity of sources, and analysis of data by synthesis. Discusses case-study approaches and style of writing for research proposals. *Prereq.* ED 3341.

ED 3345 Nature and Theory of Psychological and Educational Measurement

Examines the logic of measurement and the nature of human capacities, aptitudes, and abilities. Reviews characteristics of tests, ratings, questionnaires, and similar instruments with emphasis on their reliability, validity, and utility. Covers item analysis procedures and test standardization.

ED 3346, ED 3347 Independent Research Seminars 1, 2 4 QH each

Focuses on the design, conduct, analysis, and reporting of data from an individual research project. May be original or secondary, applied, theoretical, or action research and must be substantially larger in scope than that accommodated by directed study. Involves evaluation that will be based on oral and written interim reports in ED 3346 and oral and written final reports in ED 3347. Will serve as an option to the thesis requirement only for students enrolled in the master's degree program in educational research.

ED 3348 Research and Statistical Methods for Administrators

Studies the application of the methods of research and statistical techniques to problem solving, with specific focus on the role of research in the administrative decision-making process. May also focus on the various research designs administrators may use in their positions, such as the development of a program proposal for local, state, or federal agencies. Provides for students to select a specific topic of practical significance in administration by the student and develops a design for studying the topical problem. Evaluates research relevant to the topic. *Suggested prereq.* Rudimentary knowledge of research designs and techniques and an elementary knowledge of basic statistical methods.

ED 3349 Computer Applications of Multivariate Statistics

Explores concepts, applications, and interpretation of data analyses using the VAX computer and BMDP software package. Provides data to students and asks them to perform and interpret data analyses using statistical procedures including: multivariate analysis of variance and covariance, multiple regression, linear and multiple discriminant analysis, factor analysis and rotational techniques, and canonical correlation. *Prereq.* ED 3341.

ED 3400 Analysis of the Instructional Process

Considers the rational basis for effective teaching and the nature of the educational process. Relates learning theory to the various strategies and activities that can be implemented within a learning situation to meet the needs of the learners, including those with special needs. Employs alternative approaches, research results, and theoretical constructs to help extend the prospective teacher's understanding of the educational process and the role of the teacher in it. *Requires fifteen hours of fieldwork. Open to students in teacher certification program.*

ED 3401 Fundamentals of Curriculum Development

Examines how goals and objectives are selected and how priorities are determined. Considers methods of designing educational programs to meet specified goals and methods of evaluating educational outcomes in terms of the goals of the program and techniques for modifying programs in the light of such performance.

ED 3402 Methods and Materials for Teaching Children 1

Examines teaching methods and learning materials used in teaching children in a number of educational settings. Helps students establish objectives, plan and execute appropriate learning experiences, and effective outcomes. Focuses on writing skills, art, music, movement, and social studies. *Requires fifteen hours of fieldwork. Open to students in teacher certification program.*

ED 3403 Methods and Materials for Teaching Children 2

Provides a continuation of ED 3402. Focuses on physical and natural science, mathematics, health and nutrition. *Requires fifteen hours of fieldwork. Prereq.* ED 3402. *Open to students in teacher certification program.*

ED 3404 Methods and Materials for Teaching Adolescents and Adults 1

Considers specific methods and materials appropriate to teaching adolescents and adults. Develops in the students an understanding of the teaching and learning process, encourages attitudes conducive to and identified with good tenets of teaching, and fosters acceptance of the need to grow constantly and to be aware of the continuing development of our knowledge of the learning-teaching process. *Requires fifteen hours of fieldwork. Open to students in secondary teacher certification program.*

ED 3405 Methods and Materials for Teaching Adolescents and Adults 2

Provides for the specific subject areas to be attended to. Topics include organizing and presenting lessons, developing teaching materials, using audiovisual equipment, developing and implementing evaluation instruments, and selecting appropriate materials within each field of interest. *Requires fifteen hours of fieldwork. Open to students in secondary teacher certification program. Prereq. ED 3404.*

ED 3406 Procedures of Evaluation

Considers evaluation as a process for the improvement of learning and instruction. Topics include how to measure and evaluate affective, psychomotor, and cognitive dimensions of student growth; test construction; selecting and administering standardized tests; various bases of grading; and methods of reporting student progress. *Open to students in teacher certification program.*

ED 3407 Student Teaching with Related Seminar 8 QH

Offers a University-arranged practicum of observation and teaching in schools offering comprehensive programs within reasonable commuting distance of the University. Participating on a full-time basis requires the student to develop planning and communication abilities within his major field. Includes biweekly seminars at the University to analyze theory-practice relationships and to examine generic problems of teaching. *Prereq. Course in child or adolescent psychology; successful completion of all course work in the nondegree program. Open only to students in the nondegree teacher certification program.*

ED 3408 Evolution of Curriculum Theory and Practice

Examines from a historical perspective the curriculum of the American school as an evolutionary process resulting in part from conflict between subject-oriented and student-oriented curricula, traditionalists and revisionists, behaviorism and psychodynamism, and the interplay of forces generated by students, teachers, administrators, and other interested groups. Analyzes current curricula as the outcomes of such influences and trends for future developments will be hypothesized. Focuses on the process of curriculum development and the product of that development.

ED 3409 Seminar in Curriculum: Alternative Designs

Identifies and analyzes problems in curriculum and instruction in light of the forces affecting the curriculum within the student's area of specialization; design and implementation of solutions to such problems;

evaluation and field testing, where feasible. *Prereq. ED 3408.*

ED 3410 International Perspectives on Curriculum Planning and Development

Involves students in assessing cross-cultural curricular planning and development, assumptions underlying particular principles, and the process and problems that are related to curriculum organization in developing, industrialized, and agrarian societies. Provides for students to establish criteria for experientially based curriculum in both formal and informal educational settings and to apply the criteria developed to assess curricular patterns already in existence and to new models that they develop to meet academic and societal needs within their own cultures.

ED 3411 Seminar in Instruction: Alternative Designs

Considers methods of inventing or adapting methods of teaching to make them appropriate to the demands of the curriculum, the needs of the students, the capabilities of the teachers, the expectations of the community, and the resources of the school or college. Helps the student identify the criteria by which instructional practices may be selected, by which they may be evaluated, and by which they may be developed. Includes methods of teaching, designing learning materials, grouping students, pacing, scheduling, and evaluating. Gives students the opportunity to revise existing resources and to create new resources for instruction in order to make the implementation of a specific curriculum effective. *Prereq. Students not in joint programs with a department in another college take ED 3409 (may be taken concurrently); students in joint programs with a department in another college take ED 3400.*

ED 3412, ED 3413 Seminar in the State of the Art and Field Project 4 QH each

Examines the current curricular and instructional issues in specific teaching areas or levels, hypothesizing and projecting possible future directions in curriculum and instruction in these areas; integration of the results of these inquiries into coherent understandings of the state of the art in these areas and the development of a special project to be implemented by the students within the context of their own teaching experiences. Includes seminars to be held over a period of two quarters every other week. *Prereq. Teaching experience.*

ED 3414 Seminar in Supervision of Instruction/Reading

Examines the role of the supervisor and consultant in organizing and implementing programs. Includes organizational plans, staff supervision and development, working with parents, and accommodating special needs children.

ED 3415 Seminar in Supervision of Instruction Practicum 6 QH

Allows students to apply the skills learned in the seminar to a field setting. Provides for student fieldwork to be supervised by an on-site person and a professor. Offers periodic seminars where projects are selected and discussed. Provides for students to plan

the projects and implement these in the field and to plan and carry out a project evaluation.

ED 3420 The English-Language Arts Curriculum

Considers the design and function of the English-language arts curriculum; selected current issues as they impinge upon the English language arts curriculum; the design and function of research in the English-language arts curriculum. *Open to certified or experienced teachers. Prereq. Permission of instructor.*

ED 3421 Literature in the English-Language Arts Curriculum

Explore the historical-social, psychological, personal, archetypal, textual, biographical, and philosophical-moral aspects of literary study and their relation to the chronological, thematic, and generic demands of the literature program; sources in literature as they relate to the young reader and the implications for the English-language arts curriculum; the interrelatedness of literature and other components of the English-language arts curriculum. Allows students to identify and investigate areas of individual interest. *Prereq. ED 3420.*

ED 3422 Writing in the English-Language Arts Curriculum

Considers the cognitive and effective bases of imaginative and nonimaginative writing; the role of writing in the relationship between self and object; modes of imaginative and nonimaginative writing appropriate to the young writer; the impulse to expression in the young writer and its implications for the English-language arts curriculum; the interrelatedness of writing and other components of the English-language arts curriculum. Allows each student to identify and investigate an area of individual interest. *Prereq. ED 3420.*

ED 3423 Language in the English-Language Arts Curriculum

Examines the multiple dimensions of language study in the English-language arts curriculum; the role of inquiry in the study of language and its implications for the English-language arts curriculum; theories of grammar and their relation to the study of language in the English-language arts curriculum; the interrelatedness of language and the other components of the English-language arts curriculum. Allows each student to identify and investigate an area of individual interest. *Prereq. ED 3420.*

ED 3424 Topics in English-Language Arts Education

Investigates a matter of immediate concern to English-language arts education, but for which no organized study is ordinarily available. Topics include media in the English-language arts program, behavioral objectives in the English-language arts program, the English-language arts program for the disadvantaged. Announces seminar topic prior to registration.

ED 3425 English as a Second Language 1

Serves as a first course in teaching ESL, introducing the basic linguistic, cultural, and psychological concepts. Analyzes current approaches to teaching ESL locally and internationally from the standpoint of diagnosis, grouping, use of particular methods, and materials. Includes observations of local ongoing ESL programs. *Prereq. ED 3453.*

ED 3426 English as a Second Language 2

Continued ED 3425. Develops specific projects according to student need and interest and includes supervised clinical work. *Prereq. ED 3425.*

ED 3427 Literature and Materials Seminar

Examines literature for children, adolescents, and adults; the sources of interest in literature as they relate to the reader; the interrelatedness of literature and other components of the language arts program; investigation of materials available. Allows students to develop projects related to their needs and interests.

ED 3430 History and the Social Studies in the School Curriculum

Permits the student to explore some of the fundamental concepts of anthropology, sociology, economics, political science, and history. Emphasizes the interrelatedness of disciplines and to the extraction of operating principles from those that aid in the analyses of social problems. Equips students to find a greater variety of conceptual relationships within the historical social science field, and from there a framework for evolving courses of study may be generated. *Prereq. Teaching experience or certification.*

ED 3431 Social Science Materials Seminar

Presents a curriculum course wherein the knowledge previously acquired will be used to establish criteria for the selection and development of curriculum materials. Views all materials of instruction as means of implementation of objectives relating to specific social science concepts and skills. Tries to personalize and concretize abstract phenomena and to demonstrate their impact on the quality of human lives. Allows students to examine and analyze prepared curricula and will be asked to develop original materials that include provision for the integration of a variety of thinking, reading, and social skills. *Prereq. Teaching experience or certification.*

ED 3432 Seminar in Current Issues in the Social Studies

Employs a content approach to problems of political, economic, and social significance which have contemporary relevance for teachers of the social sciences.

ED 3440 Remediation in Mathematics

Studies an effective approach to the teaching of mathematics; diagnosis and remediation of difficulties, alternative teaching methods, techniques for the improvement of student skills and of student attitudes toward mathematics.

ED 3442 Seminar in Mathematics Education

Requires students to analyze a mathematics learning problem, to investigate relevant research, and to prepare materials embodying their own proposed solutions. *Prereq. Permission of instructor.*

ED 3444 Implementing Change in Science and Mathematics Education

Considers the planning, organization, and execution of in-service experiences for teachers, related to all phases of science and mathematics education from subject matter courses to curriculum planning to materials workshops. *Prereq. Teaching experience or certification.*

ED 3450 Foundations of Developmental Reading

Examines reading and writing as the receiving and generating of language; current developmental reading, writing, and related language skills; selected research findings bearing on relevant topics. Includes ten hours of observation or other field experience for students in the Consulting Teacher of Reading Program only.

ED 3451 Language and Reading

Introduces linguistics with emphasis on implications for reading and language instruction. Topics include the nature of language, introduction to the development of syntax, phonology and semantics, English orthography, the grammar of child language, and dialectology. *Prereq. ED 3450.*

ED 3452 Current Issues in Reading and Language

Presents three or four topics of current interest in reading and language education are investigated in depth over a three- or four-week period each during the quarter. Topics include lectures and reading on sexism in reading materials, Chapter 766 and its implications for reading and language education, "back to basics reading and language in the open and alternative education program, problems of illiteracy, bilingual and bicultural education and reading/language instruction".

ED 3453 Diagnosis and Remediation of Reading and Language Disabilities 1

Explores reading and language disabilities; causes and correlates of disability; language differences; aspects of measurement; diagnostic and corrective procedures in reading, writing, and related language skills; selected research findings bearing on relevant topics. *Prereq. ED 3450.*

ED 3454 Diagnosis and Remediation of Reading and Language Disabilities 2

Continues ED 3453. Examines selected models of language processes; cognitive and effective dimensions; problems in language pathology; and academic, perceptual-motor, and neurological learning disabilities. *Prereq. ED 3453.*

ED 3455 Teaching Reading In Junior and Senior High School

Considers developmental or corrective reading programs at the secondary level. Examines development of reading rate, comprehension, interpretation, and study skills in the content areas.

ED 3457 Clinical Practicum In Reading

Provides practicum in clinical experience, tutoring children and adults with severe reading disabilities in the Reading Clinic for a total of seventy hours under close staff supervision. Includes a one-hour seminar for discussion and case presentation following each tutoring session. Requires diagnosis, lesson plans, daily logs, complete case history, and final progress evaluation. *Prereq. ED 3453 and ED 3454.*

ED 3458 Field Practicum in Reading

Offers an eighty-hour field practicum that offers students the opportunity to apply consulting and remediation skills in a school setting. Allows students

to consult with teachers on the implementation of developmental and corrective reading and on reading in the content areas and also to provide diagnostic and remediation to pupils having special needs in reading. *Prereq. ED 3453, ED 3454, and ED 3457.*

ED 3460 International Perspectives on Teaching and Learning

Deals with categories of learning experience and modes of acquisition of learning. Emphasizes developmental needs of learners and their relationship, prevailing pedagogical patterns and societal problems in cross-cultural settings. May use African, Asian, European, and Latin-American cultures as contexts for analysis of these issues.

ED 3461 Bilingual Education, Methods, and Materials

Introduces course in the problems, programs, and principles of bilingual/bicultural education. Emphasizes the current methods and materials used in programs nationally and internationally. Studies curricular aspects of bilingual/bicultural programs as well as available research. *Prereq. Permission of instructor.*

ED 3462 Seminar in Ethnicity and Today's School Curriculum

Reviews aspects of the history and culture of some ethnic groups to explore the manner in which certain universal needs are manifested. Evaluates prepared curricular experiences and authentic literary, visual, and artifact materials, and relates to developed criteria, goals, and potential educational impact. Requires students asked to select, organize, and, as necessary, develop materials and strategies appropriate for classroom use.

ED 3463 Urban Education: An Introduction to Teaching in City Schools

Introduces an overview of urban education, especially in the public schools. Studies the demography of city schools as a basis for identifying diverse special education needs of the multicultural population, such as ESL, bilingual education, and ESD. Includes an overview and investigation of current curricular patterns related to this area of education. Includes readings, guest speakers, and first-hand observations of selected schools and programs.

ED 3470 Teaching Adults: Methods and Materials

Helps prepare participants to instruct adults in a variety of academic and nonacademic settings, and emphasizes the skills and knowledge necessary to identify objectives, plan and execute appropriate lesson plans in keeping with students' requirements, develop curricula in a variety of settings, and evaluate students' performance. Includes the presentation of both theory and application through selected case studies that exemplify adult teaching in different environments. Helps acquire the necessary skills for developing individual models of adult teaching behavior to suit various circumstances.

ED 3471 Methods and Materials in Adult Literacy

Introduces students to some current diagnostic and instructional approaches to the functionally and totally illiterate adult. Analyzes and evaluates current methods and materials. May include the development of infor-

mal diagnostic instruments and/or instructional materials for particular adult learners. Offers an overview of national and world literacy problems and programs.

ED 3482 Principles of Programmed Instruction

Studies the development and current status of self-instructional devices. Surveys available programs and teaching machines, including audiovisual machines, with emphasis on the details of the construction and evaluation of programs.

ED 3484 Selection and Utilization of Instructional Material

Deals with all aspects of instructional media, surveying types, techniques, advantages, limitations, sources, and methods of using materials and equipment in specified areas. Emphasizes the selection of appropriate media (print and nonprint) to suit given learning objectives. Provides laboratory experience in operation of equipment and the production of instructional materials.

ED 3486 Developing Multimedia Learning Packages

Allows each student to produce a multimedia (print and nonprint) instructional package for individualized learning.

ED 3500 Leadership in Education, Part 1

Designed to introduce the student to concepts of formal organization. Consists of a two-part sequence and is prerequisite to further study in the Department of Educational Administration. Provides an overview of formal organizations as social systems, with emphasis given to the leadership function. Considers relationships between individuals and organizations. Analyzes communications and decision-making functions.

ED 3501 Leadership in Education, Part 2

Continues an emphasis on the leadership function in organizations and examines selected informal organization elements such as motivation, normative order, social power, conflict, conformity, and creativity. Considers processes of change and innovation in organizations. *Prereq. ED 3500 must be completed before enrollment in ED 3501.*

ED 3502 Instructional Leadership: Curriculum Development and Supervision

Views the responsibilities of administrative personnel relating to the improvement of curricular and instructional practices. Considers evaluative techniques, inservice education, supervisory procedures, and innovative programs. Gives students the opportunity to become engaged in supervisory projects individually or in small teams. *Prereq. ED 3500 and ED 3501, or permission of instructor.*

Certain of the following courses in Educational Administration may be open only to CAGS and doctoral degree candidates or by special permission of the department chairperson, granted prior to registration.

ED 3503 Current Issues in Educational Administration

Examines critical and contemporary issues facing administrators. Analyzes the status of the administrator; federal, state, and local revenue sources; accountability; teacher militancy; equal educational opportunity; controls of schools; and urban education problems. *Required of all CAGS students.*

ED 3504 Human Relations Skills for Administrators

Offers students the opportunity to examine methods of diagnosing problems and responding in management contexts; analyzing the norms, influence patterns, roles, and control systems of organizations; performing some of the critical skills required in the leadership of human organizations; and managing an intervention for the purpose of solving an organizational problem. *Prereq. CRS 3405 or equiv.*

ED 3505 The Process of Administration

Uses case analysis and group activity to gain insight into such areas as the improvement of organizational morale, professional job satisfaction, and current issues of involvement and conflict. Examines alternative courses of action to cope with problematical events confronting educational administrators. *Required of all students pursuing the CAGS.*

ED 3506 Administration of Early Childhood Education

Includes the study of significant elements of administration unique to the planning, implementation, and operation of an early childhood education center. Considers funding sources, intra-institutional relationships, patterns for designing early childhood programs, onsite visitations, modes of private governance, use of plant, student and teacher placement, role of volunteers, and related topics. *Prereq. ED 3500 and ED 3501.*

ED 3507 Administration of the Elementary School

Surveys the operational tasks performed by the elementary school administrator. Includes school-community relations, student personnel, staff personnel, curriculum and instruction, physical facilities, finance and business management, and organizational structure. *Prereq. ED 3500, ED 3501, or permission of instructor.*

ED 3508 Administration of the Secondary School

Surveys operational tasks performed by the secondary school administrator. Includes school-community relations, student personnel, staff personnel, curriculum and instruction, physical facilities, finance and business management, and organizational structure. *Prereq. ED 3500, ED 3501, or permission of instructor.*

ED 3509 Administration of Two-Year Colleges

Examines emergence of the community college movement in the United States, administrative structures and governance, the role of faculty in planning, the student population and related student personnel services. Emphasizes the identification and utilization of community resources in curriculum development and the college's total relationships with the community in which it exists. Emphasizes the two-year technical institute and both publicly and privately supported junior colleges. Includes field visits as an integral part of course requirements.

ED 3510 Academic Administration in Higher Education

Recruitment of properly qualified faculty and staff is only one problem of the academic administrator. This course will also consider the problems of pupil services, admissions, athletics, curriculum development, accreditation, instructional resources, registration and

scheduling, faculty organization, continuing education, faculty rights and responsibilities, and personnel policies.

ED 3511 Administration of Cooperative Education

Examines significant elements in the planning, implementation, and operation of a cooperative education program. Topics include agents for institutional change, intra-institutional relationships, program costs and funding sources, cooperative education calendars, development of cooperative work assignments, relationships with cooperative employers, and operational policies.

ED 3512 Administration of Adult and Continuing Education

Studies the historical development of adult and part-time education, with attention to the present status and trends for the future, with emphasis on the administration of these programs. Includes a variety of adult educational programs in schools, colleges, junior colleges, religious agencies, social service organizations, business and industry, and professional organizations, focusing on planning, implementing, administering, financing, and evaluating such programs.

ED 3513 Problems in Urban School Administration

Examines the problems of educational administration in the complex city school system with emphasis on solutions to educational problems caused by the unique demographic characteristics of the city.

ED 3514 Administration of Experiential Education Program

Focuses on the planning, organizing, budgeting, implementing, and evaluating of experiential education programs, with particular emphasis on work-related programs in a variety of countries. Examines the development and operation of such programs as cooperative education, cooperative work experience, external degree, "sandwich courses," "enseignement en alternance," study service, and other work/school arrangements leading to discussion of the administrative problems involved. Topics include off-campus learning, administrative involvement in assessment, appropriate supervision techniques, and the development of a rationale for work in the curriculum.

ED 3515 The Administrator's Role in Supervision and Evaluation

Examines the leadership role as it relates to supervision and evaluation. Through role playing, case analysis, and the use of videotapes, students have the opportunity to engage in activities typically required of building or unit administrators. Presents a variety of supervisory and evaluation techniques and formats appropriate to both formative and summative evaluations for examination.

ED 3516 Administration and Supervision of Special Education

Designed for advanced graduate students preparing for administrative or supervisory positions in special education programs. Studies facilities and curriculum adjustments, staff roles, methods and content for in-service training, and the use of the team approach. May require field trips to observe and evaluate programs.

ED 3517 Simulated Problems: Elementary School Administration

Places students in a simulated decision-making situation as a principal or administrator of an elementary school. Presents background materials that describe all aspects of a school system, including its publics, its policies, its certified and noncertified staff members, and its geographical and socioeconomic makeup. May disseminate these background data through motion pictures, film strips, and taped interviews with influential people in the community, as well as through written materials. *Prereq.* ED 3500, ED 3501, or permission of instructor.

ED 3518 Simulated Problems: Secondary School Administration

Places students in a simulated decision-making situation as a principal or administrator of a secondary school. Presents background materials that describe all aspects of a school system, including its publics, its policies, its certified and noncertified staff members, and its geographical and socioeconomic makeup. May disseminate these background data through motion pictures, film strips, and taped interviews with influential people in the community, as well as through written materials. *Prereq.* ED 3500, ED 3501, or permission of instructor.

ED 3521 Problems in College Administration: A Simulated Experience

Places students in simulated decision-making situations as administrators of a college or junior college. Presents background materials that describe many aspects of a college, including its policies, the makeup of its faculty and student body, its financial situation, the community it serves, and its board of control. *Prereq.* ED 3528 or permission of instructor.

ED 3522 Simulated Problems: Administration of Occupational and Career Education

Challenges students with a series of simulated decision-making situations such as those which are usually faced by administrators of programs in the area of occupational and career education. Includes readings, audiovisual material, and class interactions.

ED 3523 Seminar in Educational Administration

Serves as a culminating experience for students majoring in school administration at the master's level. Confronts students with major issues facing the school and its administrators. Emphasizes applying knowledge gained in previous administrative courses to an understanding of contemporary education problems. *Prereq.* ED 3500, ED 3501, or permission of instructor.

ED 3524 Seminar in Occupational and Career Education

Confronts students with a sampling of the major issues facing administrators and supervisors of occupational and career education programs in their efforts to organize, promote, and operate such programs. Emphasizes applying the knowledge acquired in previous courses and other program experiences to arrive at an understanding of contemporary occupational and career education problems and their solutions.

ED 3525 Personnel Administration

Considers the purposes, patterns, and issues in personnel administration. Includes the skills, attitudes, and knowledge which an institutional staff needs to have and which are essential to the accomplishments of organizational goals. Focuses on personnel administration programs and problems.

ED 3526 Educational Finance

Deals with the principles and problems of financing education, and also considers the basic concepts of economics relative to the place of school finance in the field of public finance. Examines the sources and rationale for public support of schools. Includes selected state and federal aid programs, capital outlay programs, current practices and issues of local support, and bond issue campaigns.

ED 3527 School Business Management

Considers practices and issues in the administration of school business affairs. Examines the role of the school business administrator and the educational budget. Stresses principles of budget preparation and development, purchasing, supply management and distribution, school accounting and data-processing systems, auditing, financial reporting and management of payroll, transportation programs, and school food services, and the operation and maintenance programs for the physical plants. Places each student in a simulated decision-making situation. Presents background materials that have been prepared describing aspects of a fictitious school system, including its publics, policies, and other relevant information. May give each student the opportunity to deal with matters typically faced by the school business administrator.

ED 3528 Financial Management in Higher Education

Seeks to combine a knowledge of fund-raising activities with the study of proper financial management in higher educational institutions. Considers the problems of fund raising for both public and private, two- and four-year institutions. Presents modern techniques of budget preparation and control may include purchasing, school accounting, data processing, providing benefits for faculty, financial reporting, food services, housing, and operation and maintenance of the physical plant.

ED 3529 School Plant Planning, Operation, and Maintenance

Seeks to have the student develop a basic understanding of the processes involved in the planning, maintenance, and operation of school plants. Involves such items as educational specifications, the process of school construction, techniques for providing clean, safe, and healthy environments for the teaching-learning process, along with the selection, assignment, and supervision of custodial and maintenance staff. Reviews statutes or regulations pertaining to these processes used by state and local regulatory bodies. Considers issues related to declining enrollments and school closings.

ED 3530 Institutional Planning and Facilities

Considers the planning of new colleges as well as the expansion and maintenance of existing ones. Studies

systems analysis, needs surveys, and development of educational specifications for college facilities as half of the course. Involves studying the operation and maintenance of the physical plant, including provisions for housing, safety, parking, communications, and health service as the other half.

ED 3531 Systems Theory in Education

Provides the student with an introduction to general systems concepts and terminology as well as the implications of systems theory to leadership and administration. Topics include systems applications such as input/output analysis, PERT, feedback monitoring and response, flowchart logic, and the computer as a system. Considers systems study as a method of planning and evaluation. *Required of all students pursuing the CAGS.*

ED 3532 Organizational Analysis

Examines different approaches used to define traits or characteristics of formal organization. Emphasizes the application of models, typologies, and schemes to identify structural or procedural deficiencies in bureaucratic social systems. *Prereq. Permission of instructor. Open only to advanced graduate students.*

ED 3534 School-Community Relations

Includes the study and design of school-community relations programs based on the principles and practices of the intercommunications between the school and its several publics. Reviews selected research findings relative to public relations programs in business, industry, and governmental agencies in addition to those involving educational systems. Stresses the role of the administrator in the development of a comprehensive program of school community relations to the administrative unit.

ED 3535 School Law

Develops a basic understanding of federal and state laws that apply to school systems, educational programs, and personnel, as well as of the legal prerogatives available to the practicing administrator and the local boards of education. Considers the constitutional, statutory, and common-law foundations of educational systems and the school administrator's role with respect to them.

ED 3536 Collective Negotiations in Education

Provides prospective administrators and those already engaged in administration with knowledge of the collective negotiation process and collective negotiation strategies and tactics. Uses a systems approach to collective negotiations, including simulation exercises and cases. Invites guest lecturers experienced in collective negotiations in the seminar, if possible.

ED 3537 Program Planning and Workshop Design

Administrators who wish to be effective must know the techniques for directing client-needs assessment. This course presents a variety of strategies designed to help students develop skill at assessing client needs, followed by discussions regarding ways in which these needs are translated into program/workshop objectives. The administrator's role in program and workshop design, with emphasis on managing the learn-

ing activities, is demonstrated through student involvement in administrative activities. Attention is devoted to the variety of settings in which adult-education administrators work, including educational institutions, business and industry, governmental agencies, and human-service organizations.

ED 3538 Securing and Administering Grants in Education
Provides school administrators with knowledge of fund-raising for educational purposes and supervisory techniques for funded programs. Uses a systems approach to grantsmanship, emphasizing the methods and techniques of fund raising, program planning, and proposal writing.

ED 3540 Typologies of Higher Education
Studies the types of higher educational institutions, with emphasis on organizational structure, modes of governance, and administration. Considers the history of higher education, particularly the development of colleges, universities, and junior colleges in the United States, to provide perspective for the modern college administrator. Focuses on important issues and the problems they present for administrators.

ED 3541 Innovation and Change
Emphasizes administrative strategies in effecting structural alterations, curricular organization, and instructional techniques, which vary the particular problems relevant to the issues that receive consideration. *Required of all students pursuing the CAGS.*

ED 3542 Politics and Educational Decision-Making
Examines federal, state, and local governmental arrangements and political processes that influence educational policies of school systems. Emphasizes the application of political science concepts and research methods to educational policy-making processes and to the political environment surrounding the educational administrator.

ED 3543 Directed Field Experiences in the Administration of the Elementary School

Coordinates study and discussion of administrative functions with selected field trips to administrative settings and with guest lectures by practicing elementary school administrators. Visits such settings as an elementary school, a middle school, a superintendent's office, a school committee meeting, and appropriate federal and state agencies. Requires each student to participate in an administrative field experience in an elementary setting for a minimum of four hours per week. *Prereq. ED 3500 or permission of instructor. Required of all master's candidates who major in school administration.*

ED 3544 Directed Field Experiences in the Administration of the Secondary School

Serves as a companion course to ED 3543, required of all master's candidates in school administration. Coordinates study and discussion of administrative functions with selected field trips to administrative settings and with guest lectures by practicing secondary school administrators. Aimed at educational agencies at the secondary level and may include visits to a comprehensive high school, a junior high school, a regional voca-

tional-technical school, a superintendent's office, a school committee meeting, and appropriate federal and state agencies. Requires each student to participate in an administrative field experience in a secondary school for a minimum of four hours each week. *Prereq. ED 3500 or permission of instructor. ED 3544 may be a continuation of ED 3543 or may precede it.*

ED 3545 Practicum Administration

Serves as an individualized offering involving supervised observations, internships, externships, and seminars in educational administration. Designed to provide further practical experience in the student's area of administrative preparation. Must be worked out with the adviser not later than the end of the second week of the quarter preceding the quarter during which the internship will take place.

ED 3546 Practicum in Special Education Administration

Serves as an individualized offering for students preparing for administrative roles in areas of special education. Offers experiences in supervised observations, internships, externships, and seminars in special education administration. Must be worked out with the student's adviser not later than the end of the second week of the quarter preceding that in which the internship is to take place.

ED 3800 Directed Study

Provided for the student whose unique academic needs or interests cannot be adequately satisfied in any of the scheduled courses of the department. Not available to special students. *Prereq. Approval of the chair of the department and of the director of the graduate school. Approval forms must be submitted during the quarter prior to registration for the directed study.*

ED 3801 Thesis

8 QH

Offers a research activity that may be selected by the student in lieu of two courses (8 QH), with the approval and recommendation of the adviser.

ED 3806, ED 3807, ED 3808 Doctoral Seminar in Leadership, Administration, and Supervision 1, 2, 3

Uses the dialogues in these courses as an interdisciplinary approach to explore complex behavioral and structural interactions found in formal organizations. Emphasizes integrating theoretical concerns with practical administrative functioning.

This sequence of seminars is viewed primarily as a pooling of the results of extensive individual student research and activities and is aimed at giving the student an overview of all aspects of the institution he or she will be leading. *These seminars open only to students who have been accepted to a doctoral program. Required of all students pursuing the EdD degree.*

ED 3809 Doctoral Dissertation

Prereq. Admission to candidacy in the Doctor of Education Degree Program.

ED 3820 Workshop in Foundations of Education

(See general workshop description on page 74.)

ED 3821 Workshop in Elementary Education

(See general workshop description on page 74.)

ED 3822 Workshop in Secondary Education
(See general workshop description on page 74.)

ED 3823 Workshop in Administration
(See general workshop description on page 74.)

ED 3825 Institute in Elementary Education
(See general institute description on page 74.)

ED 3826 Institute in Secondary Education
(See general institute description on page 74.)

ED 3827 Institute in Educational Administration
(See general institute description page 74.)

ED 3828 Institute in Foundations of Education
(See general institute description page 74.)

Health, Sport, and Leisure Studies

HSL 3410 Contemporary Theories of Recreation and Sport
Considers historical and philosophical perspectives of recreation, sport, and leisure. Emphasizes change over time and its implications for the leisure industry.

HSL 3412 Seminar in Contemporary Issues and Problems in Recreation, Sport, and Fitness
Discusses national and international issues, current trends, and contemporary problems as they affect recreation services.

HSL 3421 Budget Analysis
Explores capital and operating budgets using such techniques as cost-effectiveness and benefit-cost analysis, forecasting, and present value analysis. Studies the concepts of depreciation, direct and indirect costs, and service volume as they relate to pricing decisions. Focuses on improving management decisions.

HSL 3425 Public Relations and Marketing for Recreation, Sport, and Fitness

The central purpose of public relations is to influence public opinion. This course focuses on the practical aspects of public relations for recreation, sport, and fitness enterprises. Emphasis is on linkages among public relations, marketing, and personnel management.

HSL 3506 Nutrition
Studies nutrition principles, behavior, and counseling, as well as clinical applications of nutrition as it relates to health, exercise, sport, and cardiac rehabilitation. *Prereq. Exercise physiology, nutrition, or permission of instructor.*

HSL 3615 Anatomic Kinesiology
Examines the human musculoskeletal system with respect to the internal and external forces acting upon the human body. Applies principles of statics and dynamics in normal and atypical motion. *Prereq. Kinesiology or permission of instructor.*

HSL 3616 Mechanical Analysis of Human Motion
Applies mechanics of motion to human motion. Provides an overview of the methodology of human motion analysis. Emphasizes the use of film and video in teaching, coaching, clinic, and human motion research. *Prereq. HSL 3615.*

HSL 3617 Physical Fitness Appraisal and Guidance
Considers principles and procedures used to administer lab and field tests of cardiovascular endurance, body composition, joint flexibility and muscular strength, power, and endurance. Explores principles and procedures used to develop conditioning programs to improve these parameters. Focuses on the low-risk individual in nonclinical settings. *Prereq. Exercise physiology or permission of instructor.*

HSL 3618 Exercise in Health and Disease
Studies role of exercise in health and disease including acute and chronic effects of exercise upon the cardiovascular, respiratory, metabolic, and muscular systems of individuals with cardiovascular, pulmonary, or metabolic diseases. Surveys principles of human performance assessment, exercise prescription and programming applied to adults in exercise-based prevention, intervention, and rehabilitation programs. *Prereq. Exercise physiology.*

HSL 3619 Electrocardiography
Studies basic and intermediate electrocardiography, including cardiac function, lead systems, rate, rhythm, axis, infarction, ischemia, hypertrophy, effects of cardiovascular drugs, and purposes and principles of exercise testing. *Prereq. HSL 3618.*

HSL 3620 Laboratory in Exercise Testing and Prescription
Offers a practicum in clinical graded exercise testing including determination of EKG, blood pressure, pulmonary, and metabolic response to exercise, and prescription of exercise for at-risk to high-risk persons in cardiopulmonary prevention, intervention, and rehabilitation programs. Requires students to do clinical fieldwork as exercise test technicians in prevention and/or rehabilitation programs and to conduct a project. *Prereq. HSL 3618 and HSL 3619. (HSL 3619 may be taken concurrently.)*

HSL 3621 Advanced Cardiopulmonary Physiology
Surveys the current knowledge of cardiovascular function relating the physiology of the circulatory system in its normal, diseased, and stressed states. Emphasizes the interaction between the components of the cardiovascular and respiratory systems. Current research topics will be covered. *Prereq. HSL 3618.*

HSL 3622 Cardiovascular Pharmacodynamics in Clinical Exercise Physiology

Studies the current medications used in the treatment of congestive heart failure, coronary artery disease, arrhythmias, angina, and hypertension; the effects of these medications during acute and chronic exercise; and cardiac emergency medications. *Prereq.* HSL 3619 and HSL 3623.

HSL 3623 Cardiopulmonary Pathophysiology

Offers lecture and laboratory study of anatomy, physiology, and pathophysiology for the cardiac and pulmonary systems as applied to the dysfunction and rehabilitation of the cardiopulmonary patient. *Prereq.* HSL 3618.

HSL 3624 Applied Biomechanics for the Exercise Specialist

Applies anatomical and biomechanical principles to exercise technique, exercise-induced injuries, and exercise equipment. Designed specifically for students in the clinical exercise physiology program, and is not open to students in other concentrations. *Prereq.* Undergraduate course in anatomy.

HSL 3627 Health Promotion Program Planning

Examines health promotion programs in a variety of settings including program components, assessment, design, implementation, and evaluation. Discusses case studies from health-related programs to assist students in developing wellness and health promotion philosophy and strategies. *Prereq.* HSL 3618 or permission of instructor.

HSL 3642 Sociology of Sport

Analyzes the sociological principles and factors operative in the interaction between sport and society. Reviews pertinent literature and research. Topics include the pervasiveness of sport, social stratification, politics, economics, sport and the mass media, race, women, violence, competition, deviance, subcultures, and sport in the future. *Prereq.* General sociology or permission of instructor.

HSL 3651 Supervision of Professional Personnel

Studies ways of effectively matching the needs of individuals with those of the organization. Emphasizes leadership, conflict resolution, and evaluation from an organizational development perspective.

HSL 3652 Critical Thinking and Evaluation

Investigates the acquisition of knowledge in two disciplines. Includes evaluating knowledge and practice through experiences in decision-making, logical analysis, and critical thinking.

HSL 3653 Legal Issues in Recreation, Sport, and Fitness 3 QH

Analyzes recreation and sport from legal, social, and economic standpoints. Emphasizes the impact of law and legal principles on recreation and sport.

HSL 3654 Club and Sport Enterprise 3 QH

Provides an overview of the club and resort industries with emphasis on internal and external sources of industry information and practical uses of such information. Studies external factors that influence industry trends. This is an introductory course.

HSL 3655 Facilities and Operations Management 3 QH

Studies the day-to-day work required of operating managers in selected recreation, sport, and fitness settings. Emphasizes how technology and human relations can best be used to carry out the operations of an organization. *Prereq.* HSL 3654.

HSL 3656 Strategic Planning for Clubs and Resorts 3 QH

Analyzes internal and external factors that impact on long-term operations of clubs and resorts. Studies the development and implementation of competitive strategy. Integrates information from the following prerequisites: the club and resort enterprise, club facilities and operations, research design, financial analysis, marketing, and organizational behavior.

HSL 3657 Managing the Professional Sports Franchise 3 QH

Discusses and analyzes major issues facing managers of a professional sports franchise. Focuses on topics such as corporate structure, finance, player negotiations, contracts, press relations, and auxiliary enterprises.

HSL 3822, HSL 3823 Seminar/Workshop

Presents special seminars or workshops in recreation and leisure studies on topics of timely interest. Provides for graduate credit to be granted for successful completion of a workshop, but credit may not be applied toward a degree program without the program adviser's approval. Includes a maximum of eight quarter hours earned in seminars or workshops that may be applied toward the degree.

HSL 3824 Master's Project/Internship 6 QH

Will be designed in close consultation with faculty and industry sponsor. Intends to develop greater breadth or depth of understanding of important management issues in a specific segment of the recreation, sport, and fitness industry. Provides for projects to be submitted to a faculty committee for evaluation. Concludes as students present orally the findings related to their projects and defend conclusions against questions raised by the faculty review committee.

HSL 3830 Internship in Clinical Exercise Physiology 1

Offers a supervised part-time internship in a preventive/rehabilitative health and exercise program providing care to individuals with cardiovascular, pulmonary, or metabolic disease, or in an applied exercise physiology laboratory. Includes clinical exercise testing, exercise prescription, and/or exercise leadership. Requires students to complete a minimum of 120 hours during a six- to twelve-week period. Requires a proposal for a review of literature and three case studies related to the internship site to be approved by the student's faculty supervisor.

HSL 3831 Internship in Clinical Exercise Physiology 2

Continues the supervised internship in another role in a preventive/rehabilitative health and exercise program or in an applied exercise physiology laboratory. Requires students to complete a minimum 120 hours during a six- to twelve-week period of clinical experience. Requires a review of literature and three case studies to be completed and approved by the faculty supervisor.

HSL 3894 Independent Study

Under the guidance and direction of a program adviser, gives students the opportunity to develop and conduct projects related to their professional interests. *Prereq.* *Written proposal and permission of program adviser.*

HSL 3898, HSL 3899 Seminar/Workshop

Offers special seminars or workshops on topics of timely interest. May provide for graduate credit to be granted for successful completion of a workshop, but credit may not be applied toward a degree program without the program adviser's approval. Allows a maximum of eight quarter hours earned in seminars or workshops to be applied toward the degree.

Physical Therapy

PTH 3505 Cardiopulmonary Diagnostic Techniques

Provides an overview of the various noninvasive and invasive techniques for diagnostic purposes, including examination of these techniques as guidelines useful in determining the extent of cardiopulmonary damage, work capacity, and residual function. Studies techniques including electrocardiography, systolic time intervals, pulmonary function, laboratory test findings, and gas analysis. *Prereq.* *PTH 3560, HSL 3618, or permission of instructor.*

PTH 3510 Cardiac Rehabilitation Programs 2 QH
Phases 1, 2

Surveys various cardiac rehabilitation programs, their objectives, relevant medical considerations, indications, and contraindications. Topics include referrals, organizational structure, proposal writing, liabilities, and insurance plans available for these two phases of rehabilitation. *Prereq.* *PTH 3560 or permission of instructor.*

PTH 3515 Pulmonary Rehabilitation Programs 2 QH

Explores theory and practice of pulmonary therapy. Utilizes treatment procedures with medical and surgical respiratory patients. *Prereq.* *PTH 3560 or permission of instructor.*

PTH 3527 Medical and Surgical Conditions of Cardiac and Pulmonary Patients

Examines current medical and surgical treatment of cardiac and pulmonary anomalies and dysfunction. Investigates the acute and chronic disorders that cause these dysfunctions, as well as their etiologies, symptomatology, and treatment. Identifies the techniques of various surgical procedures, as well as the preoperative, intraoperative, and postoperative management of the patient. Investigates the role of the physical therapist. *Prereq.* *Minimum of one year in cardiopulmonary therapy, PTH 3560, or permission of instructor.*

PTH 3530 Basic Applied Neuroanatomy

Studies the human nervous system from a functional perspective, including analysis of components of the nervous system as they relate to common clinical problems. Emphasizes the therapist's role in recognizing

and treating these problems. *Prereq.* *Gross Human Anatomy or permission of instructor.*

PTH 3535 Advanced Functional Neuroanatomy

Studies anatomy of the nervous system from a functional perspective. Focuses on the role of the cortex, basal ganglia, thalamus, and cerebellum in regulation of tone control, sensation, and posture. Uses current and classic literature. *Prereq.* *PTH 3530.*

PTH 3540 Advanced Topics in Neurodevelopment

Examines and interprets both classic and current nonhuman and human research studies. Presented in seminar format. *Prereq.* *One year of clinical experience in neurology, PTH 3560, or permission of instructor.*

PTH 3545 Neuromuscular Physiology

Considers classic concepts of normal muscle and nerve structure and function. Emphasizes clinical impacts of disease and injury on neuromuscular morphology and physiology where appropriate. Gives the student the opportunity to become familiar with current theory that may be relevant to evaluation and management courses offered in the program.

PTH 3550 Evaluation of the Neurologically Impaired Adult

Provides a framework for analyzing motor dysfunction, based on the fundamental properties underlying movement disorders, which is then used to critique current evaluations of neurologic disabilities and to develop a rationale for a logical and comprehensive evaluation of the neurologically impaired adult. *Prereq.* *PTH 3560, equiv. or permission of instructor.*

PTH 3555 Treatment of the Neurologically Impaired Adult

Discusses treatment of the neurologically impaired adult from a historical perspective and from current neurological and neurophysiologic knowledge. Critiques current techniques from a clinical and theoretical point of view. Topics include specific treatment techniques as well as specific neurologic disabilities. *Prereq.* *One year clinical experience in physical therapy with background in treatment of neurologic patient and PTH 3550.*

PTH 3560 Practicum in Physical Therapy 1

Offers practicum in supervised clinical practice within the specified specialty area. Expects students to com-

plete 240 hours of clinical experience in a healthcare setting. *Required as a prerequisite in selected courses for those students who do not have a minimum of one year of clinical experience at the time of registration for these courses.*

PTH 3576 Evaluation and Treatment of the Neurologically Impaired Child

Reviews and analyzes clinical tests and measurement strategies utilized by clinical specialists in neurologic/pediatric physical therapy is done with an emphasis on the use of standardized tests to include data interpretation. Focuses on the use of the problem-solving

approach to client care, incorporating the collection and analysis of data with the selection of specific treatment strategies in the development of a treatment plan. Analyzes and reviews the selection of treatment strategies with an emphasis on the investigation of the rationale and efficacy of the same.

PTH 3800 Independent Study

Under the guidance and direction of a program adviser, gives students the opportunity to develop and conduct projects related to their professional interests. *Prereq. Written proposal and permission of program adviser.*

Speech-Language Pathology and Audiology

SLA 3300 Introduction to Speech and Hearing

Offers an overview of speech and hearing disorders and treatment, and a review of normal speech and hearing development. Requires clinical observations of persons with speech, language, and hearing disorders.

SLA 3301 Hearing Science

Presents concepts related to the physics of sound, followed by an in-depth study of the anatomy and physiology of the normal hearing mechanism. Also discusses principles of psychophysics of audition.

SLA 3302 Anatomy and Physiology of Vocal Mechanisms

Offers an in-depth study of the static structure, musculature, and physiology of the speech mechanism. Emphasizes current research in speech physiology.

SLA 3303 Introduction to Audiology

Focuses on the techniques of audiometric testing and hearing conservation, including a review of hearing sciences and a prepracticum and lab experience in hearing testing.

SLA 3304 Speech Science

Examines the basic sciences involved in speech and audition, including in-depth study of the analysis of sound and the acoustic composition of speech. Emphasizes a review of current theory and research in speech reception, perception, and production. *Prereq. SLA 3300 and SLA 3301.*

SLA 3305 Fluency Disorders

Offers a comprehensive study of the various theories and symptomatology of stuttering from the earliest historical references through the nineteenth and twentieth centuries. Requires clinical observations.

SLA 3306 Developmental Semantics and Syntax

Analyzes the emerging semantic and syntactical aspects of language in normal and atypical children. Discusses current theory and research in language acquisition. Requires clinical observations of children with normal and atypical language patterns.

SLA 3307 Phonetics and Developmental Phonology

Offers basic training in auditory recognition and symbolization of phonemes and allophones in major North American dialects. Stresses static and dynamic articulatory descriptions. Also includes a review of the developmental sequence of phonemic acquisition.

SLA 3308 Phonemic Disorders

Provides a practical and theoretical examination of phonemic disorders and etiology; also examines diagnostic tools for evaluation and methods of treatment. Requires clinical observations of persons with phonemic disorders.

SLA 3600 Neurological Bases of Communication

Provides the student the opportunity to acquire a basic understanding of neuroanatomy and neurophysiology as they relate to normal aspects of speech, hearing, and language.

SLA 3601 Advanced Study in Articulation Disorders

Explores advanced theories of normal and abnormal phonological development with emphasis on distinctive theory and on phonetic theories of speech production; direct application of theories to diagnosis and treatment of various phonological disorders. *Prereq. Undergraduate course in articulation disorders and permission of instructor.*

SLA 3604 Language Disturbances in Children

Emphasizes current theories in language behavior and their practical application to the assessment and remediation of language disturbances in children. Uses lectures, discussions, and case presentations to focus on the following issues: what constitutes a language problem, what assessment tools and therapeutic techniques are currently available, and what underlying principles are involved in selecting and organizing the content of a remediation program. *Prereq. Permission of instructor.*

SLA 3605 Aphasia Rehabilitation

Provides training in the diagnosis and remediation of adult neurologically based communication disorders. Reviews clinical methods of diagnosis and demonstrates their application to therapeutic decision-making. *Prereq. SLA 3600 and permission of instructor.*

SLA 3606 Clinical Management in Stuttering

Emphasizes diagnostic techniques, a review of the current therapeutic approaches, consideration of the individual's need in therapy, and the process of behavioral and attitudinal change from within a psychodynamic framework. Considers termination, referral, and group therapy. *Prereq. Permission of instructor.*

SLA 3607 Seminar in Speech Science

Focuses on current physiological, acoustical, and perceptual data used to describe both normal and disordered speaking populations. Examines research techniques and instrumentation in the field of speech science. Discusses the application of theoretical information from speech science to the diagnosis and treatment of communicative disorders. *Prereq.* SLA 3875 and SLA 3876

SLA 3608 Seminar in Voice Disorders

Considers etiology, symptomatology, and disorder complexes related to phonation. Emphasizes the philosophy and methods used in the assessment and treatment of voice disorders. *Prereq.* SLA 3302 and SLA 3655.

SLA 3610 Audiology for Speech-Language Pathologists

Provides speech-language pathology majors a review of standard procedures and an update of contemporary issues in audiology. Focuses on pathological disruption of the auditory system and on assessment procedures currently applied and their relationship to patient management and treatment plans.

SLA 3620 Diagnostic Audiometry

Presents an in-depth examination of the various uses of pure tone, speech, and impedance measures as they relate to the standard audiological assessment. Covers case history and case reporting. *Prereq.* *Introduction to audiology or permission of instructor.*

SLA 3623 Differential Diagnosis in Audiometry

Examines in detail the site of lesion test battery approach to differential diagnosis in audiology. Topics include Bekesy, ENG, SISI, tone decay tests, ABLB, acoustic reflex, and auditory evoked potentials (ABR). *Prereq.* SLA 3620 or permission of instructor.

SLA 3624 Amplification

Explores physical characteristics of hearing aids and their performance. Offers theoretical approach to selection and fitting of hearing aids, and analysis of hearing aid dispensing systems. *Prereq.* *Introduction to audiology and permission of instructor.*

SLA 3625 Psychosocial Aspects of Communication Disorders

Covers the psychological, educational, and social aspects of communication disorders, particularly auditory impairment. *Prereq.* *Permission of instructor.*

SLA 3626 Seminar in Audiology

Offers advanced study of the development of principles and theories associated with modern procedures and methods used in audiology. *Prereq.* *Permission of instructor.*

SLA 3628 Psychoacoustics

Explores the relationship between acoustic stimuli and psychological responses to sounds. Stresses the similarities and differences in the perception of normal hearing and among different types of impaired hearing. Topics include a general review of the physics of sound, detection, discrimination, masking, binaural hearing, and speech perception. *Prereq.* *Permissison of instructor.*

SLA 3629 Aural Rehabilitation

Examines various approaches to speechreading and auditory training in detail as they apply to children and adults. Provides an integrated approach to management of hearing-impaired individuals. *Prereq.* *Introduction to audiology.*

SLA 3630 Auditory Pathology

Provides an overview of temporal bone and eighth nerve anatomy. Discusses physiology of the auditory system. Covers the more frequently encountered pathologies affecting the auditory system as well as medical/surgical treatment of those disorders.

SLA 3631 Rehabilitative Audiology

Required of all audiology majors. Provides information about the effects of hearing loss on communication, the role of the audiologist in the rehabilitation process, approaches to counseling, uses of amplification, and issues in industrial and educational hearing conservation.

SLA 3632 Professional Practice

Provides contemporary information relative to the practice of audiology. Topics include planning a business practice, establishing a successful business operation, securing third-party reimbursement, and providing services within state licensing and ASHA ethical guidelines.

SLA 3640 Cerebral Palsy

Studies neuromuscular involvements and concomitant language and speech disorders; intellectual deficits, psychological aspects, communicative disorders of a cerebral palsied population; and testing, placement, and management of the cerebral palsied child with emphasis on a multidisciplinary approach. *Prereq.* *Permission of instructor.*

SLA 3641 Physiological Acoustics

Emphasizes the biophysics of the hearing mechanism, especially in terms of actual clinical utility. Stresses comparative anatomy and physiological analysis. *Prereq.* *Introductory courses in speech and hearing, and permission of instructor.*

SLA 3642 Seminar in Orofacial Anomalies

Considers etiology, symptomatology, and problems associated with orofacial anomalies. Emphasizes the speech, language, and hearing characteristics and the assessment and treatment of persons with orofacial anomalies. Presents psychological and social considerations and analysis of the team habilitative effort.

SLA 3643 Seminar in Speech Pathology

Offers individual research and/or critical review of the literature in some area of basic science, speech sound learning, language, voice, fluency, or multiple disorders, with special emphasis on the impact of deafness on psychosocial development. May include class presentation of material and class discussion. *Prereq.* *Open to graduate students who have completed the equivalent of two quarters of graduate work in speech pathology and have the instructor's permission.*

SLA 3645 Neuropathology

Applies functional neuroanatomy in comprehending the various disease processes involving the nervous system: cerebrovascular disease tumors or malformations, Parkinson's disease, multiple sclerosis, and others. *Prereq.* *Permission of instructor.*

SLA 3647 Seminar in Hearing Science

Offers individual research and/or critical review of the literature in the area of bone conduction of auditory signals, evoked response and audiometry, impedance and audiometry, cortical processing of auditory input, and other related topics. Requires students to be responsible for class presentations of researched material. *Prereq.* *Permission of instructor.*

SLA 3650 Medical Perspective to Anatomical Correlates in Speech Pathology

Provides hands-on experience with dissection of human larynxes as an approach to learning voice tract anatomy. May familiarize students with dissection techniques and use of dissecting microscope, and may give them an opportunity to observe actual surgical procedures in a hospital. *Prereq.* *Permission of department chair.*

SLA 3651 Social Dialectology: Theoretical and Educational

Focuses on the social and cultural influences on the language behavior and communication needs of the culturally "different" child. Emphasizes the interrelationship between linguistic structure and social structure and its implications for clinical intervention. *Prereq.* *Permission of instructor.*

SLA 3652 Behavior Modification: Operant Procedures in Speech and Language Training

Reviews principles and procedures of the functional analysis of behavior and focuses upon the application of behavioral theory and research to speech, language, and hearing training. Emphasizes clinical investigation in the experimental analysis of behavior of communications disorders and experiences in the application of experimental procedures in assessment and treatment programs. *Prereq.* *Permission of instructor.*

SLA 3653 Seminar in Communication Disorders

Provides an exploration into the development of communication and communication disorders, with focus on early conversational interaction, children's discourse, and pragmatic intents. Emphasizes deficient social bases and their effect on language performance as well as trends for clinical procedures and intervention strategies for language-disordered children. Views communication as the ultimate goal of therapy. Requires course participants to complete a research project on the development of communication and child discourse and its application to clinical assessment and intervention.

SLA 3654 Augmentative Communication

Provides a theoretical understanding of the principles involved in the prescription of hardware and software to the non-speaking, hands-on training in the use of computer software, and on-site clinical training in the use of that software. *Prereq.* *Graduate student status and understanding of principles of learning theory or therapy process or permission of instructor.*

SLA 3655 Differential Assessment

Explores and explains the relationship between different models of speech and language processing and their implications for diagnostic procedures and test selection. Focuses on analysis of case history information, interpretation of diagnostic results, understanding normative data, evaluation of test reliability and validity, and demonstration of various test instruments.

SLA 3690 Seminar in Normal Language Acquisition

Assesses current theories and designs of studies of language acquisition and processing from infancy through adolescence. Discusses special problems in data collection and analysis in the various areas of child language through lectures, student presentations, and discussions of current research. Critiques methodology, data, and results of current research and their significance to theories of language acquisition using video-taped and audio-taped data samples. Requires each student to write a research proposal to investigate a specific topic in language acquisition.

SLA 3691 Sociolinguistics

Consists of basic sociolinguistic concepts including dialectal variation and other forms of language variation, attitudes toward language use and the speech community; language needs of multicultural children in educational settings, considering cultural attitudes of teachers and types of learning situations available; and social and cultural diversity and its effects on the individual's communicative competence. Includes methods of sociolinguistic research that will lead to the student designing a language study for application in: discourse analysis; language in the classroom; sociolinguistic effects on reading, writing, oral language, and role relationships.

SLA 3698 Workshop in Speech Pathology and Audiology
(See general workshop description on page 74.)**SLA 3699 Institute in Speech Pathology and Audiology**
(See general institute description on page 74.)**SLA 3800 Directed Study**

Provides for the student whose unique academic needs or interests cannot be adequately satisfied in any of the scheduled courses of the department. Not available to special students. *Prereq.* *Approval of the chairperson of the department and of the director of the graduate school. Approval forms must be submitted during the quarter prior to registration of the directed study.*

SLA 3801 Thesis

Offers a research activity that may be selected by the student in lieu of two courses (8 QH), with the approval and recommendation of the adviser.

SLA 3875 Advanced Clinical Practice 1**2 QH**

Offers a two-quarter sequence of supervised clinical experience in speech pathology and audiology designed for beginning graduate students. Includes practicum sites at the Northeastern University Hearing, Language, and Speech Clinic; satellite clinics; and/or educational settings. Requires students to be available a minimum of two days per week during the academic year. Requires attendance at on-campus seminar

meetings held weekly. *Prereq.* Departmental permission and GPA of 3.0.

SLA 3876 Advanced Clinical Practice 2 3 QH
Offers a two-quarter sequence of supervised clinical practicum in speech pathology and audiology at the Northeastern University Hearing. Considers language and speech clinic; medical settings; educational settings; and rehabilitation centers. Uses practicum experience to emphasize advanced diagnostic and management techniques stressing the application of theory to practice. Requires students to be available a minimum of two days per week during the academic year. *Prereq.* Departmental permission and GPA of 3.0.

Interdepartmental Courses

INT 3500 Research Design and Methodology
Considers research methods and designs used in a variety of professional settings. Emphasizes the development of research techniques, including the ability to define research problems; write hypotheses; review and interpret literature; apply research designs; organize, analyze, and present data; and draw relevant conclusions. *Prereq.* Satisfactory completion of the proficiency examination in statistics or satisfactory completion of any graduate-level statistics course offered by Boston-Bowé College of Human Development Professions.

INT 3501 Thesis/Project 1
Provides the initiation of a scholarly investigation. Requires students to submit a written research proposal for approval by a thesis/project committee and to present an oral proposal at a college seminar. *Prereq.* ED 3340, INT 3500, completion of two courses in area of concentration, and permission of program adviser.

INT 3502 Thesis/Project 2
Continues INT 3501 implemented with, and culminating in, an approved written report in thesis form. *Prereq.* INT 3501.

INT 3503, INT 3504 Seminar/Workshop
Offers special seminars or workshops on interdepartmental topics of timely interest. Graduate credit may be granted for successful completion of a workshop, but credit may not be applied toward a degree program without the program adviser's approval. A maximum of eight quarter hours earned in seminars or workshops may be applied toward the degree.

INT 3540 Computer Applications for Nonprofit Organizations 3 QH
Presents ways in which generic software packages (database management, spreadsheets, business graphics, and word processing) may be used to improve efficiency and the effectiveness of individuals and organizations. Discusses hardware and software configurations.

INT 3549 Introduction to Computer Programming: FORTRAN
Presents a lab course designed to develop facility in the use of a wide range of data-processing equipment in educational research. Introduces the basic principles of

SLA 3877 Advanced Clinical Practice 3 3 QH
Offers a two-quarter sequence of supervised clinical practicum in speech pathology and audiology designed for advanced graduate students. Uses practicum experience to emphasize problem-solving techniques relevant to case management. Requires students to be available a minimum of two days per week during the academic year. *Prereq.* Departmental permission and GPA of 3.0.

computer programming, but emphasis will be placed on the applicability and use of existing statistical programs.

INT 3550 Instruction in LOGO
Emphasizes philosophy and programming in the LOGO language. Demonstrates curriculum materials showing the use of the LOGO language in areas such as computer programming, mathematics, and language arts. Presents current research and applications of LOGO in the school curriculum. Requires creation of individual LOGO projects in lab settings.

INT 3551 Instructional Programming in Pascal
Introduces computers and computer programming using the language Pascal. Discusses tools such as text editors. Makes instructional applications where possible.

INT 3552 Computer Use for Educators 2 QH
Designed for educators with minimal computer experience and provides an introduction to word processing, data processing, and file management. Discusses functions of the operating system and the physical hardware. Introduces the BASIC programming language. Gives students extensive hands-on experience in class and through accompanying supervised labs.

INT 3553 Word Processing for Educators 2 QH
Teaches a variety of word processing software programs. Considers applications of word processing ranging from simple one-page letters to documents and mail-merge. Gives students extensive hands-on experience with computers in class and through accompanying supervised laboratories.

INT 3554 Computers in Education
Focuses on the use of computers both as a teaching methodology and as an administrative tool in education. Introduces the use of Computer Assisted Instruction (CAI) through the BASIC programming language. Tests a variety of microcomputer software packages suitable for classroom and administrative use in a laboratory setting. Requires extensive hands-on experience with a number of commercially available educational software packages. Highlights strategies and methods for integrating computing within the elementary and secondary curriculum.

INT 3555 Introduction to Computer Use for Professionals

Includes introduction to computer capabilities and limitations; selection of hardware/software; use of a line editor, introduction to system command language; and introduction to data processing through a packaged library program such as SPSS, BDMP, MINITAB, or IMSL.

INT 3556 Educational Applications of Database Management Systems

Uses several general purpose software packages (database, spreadsheet, and data analysis) and simulations for working through such problems as scheduling/facilities usage, recordkeeping and general ledger/accounting, and survey/market research.

INT 3557 Instruction in LOGO 2

Represents a second course in the LOGO environment, emphasizing advanced concepts in LOGO, including the use of list-processing in language, music, physics, and mathematics. *Prereq.* INT 3550.

INT 3570 Determinants of Drug-Taking Behavior

Studies psycho-social factors present in substance abuse from youth through adulthood. Focuses on family, peers, media, environment, and lifestyle.

INT 3571 Substance Abuse Law, Policy, and Ethics

Offers an overview of the laws, policies, and ethics in substance use, misuse, and abuse on the local, state, and national level.

INT 3572 Internship

Presents a supervised field experience in a substance abuse program/agency for one quarter. Requires students to spend a minimum of six hours per week in the setting accompanied by a weekly seminar on campus. *Prereq.* CRS 3452, HSL 3670, INT 3570, and PCL 3145.

Institutes

CRS 3803, CRS 3804, CRS 3805, ED 3825, ED 3826, ED 3827, ED 3828, HSL 3822, HSL 3898, SLA 3699

A department may offer a special institute in a specific field of interest from time to time. The institute may be collaborative, offered by the several departments in the Boston-Bouvé College of Human Development Professions, and will usually include a special institute faculty drawn from resources outside the University, and from the Boston-Bouvé faculty. The institute focuses on a specific area of academic study and may be interdisciplinary in nature; it involves total time commitments on the part of participants in morning, afternoon, and evening sessions, five or six days per week, for one to eight weeks, depending upon the nature and scope of the institute. Institutes are customarily designed for participants who are currently employed in a common field of work and wish to receive additional preparation in new methods, new materials, and new content areas. Graduate credit may be granted for successful completion of an institute but may not be applied toward a degree program at the University without the approval of the departments in which students are doing their major field of specialization degree work. All institute participants must be degree candidates in the graduate school or must qualify, prior to registration, as special graduate students. *Prereq.* *Permission of institute instructor.*

Workshops

CRS 3806, CRS 3807, ED 3820, ED 3821, ED 3822, ED 3823, HSL 3823, HSL 3899, SLA 3698

A department may offer a special workshop in a specific field of interest from time to time. Emphasis in the workshop is focused on the development of instructional materials or the resolution of practical problems with a single school or institutional setting. Workshops may also be held for a group of potential participants who are currently employed in a common field of work. Graduate credit may be granted for successful completion of a workshop but may not be applied toward a degree program at the University without the approval of the departments in which students are doing their major field of specialization degree work. All workshop participants must be degree candidates in the graduate school or must qualify, prior to registration, as special graduate students. *Prereq.* *Permission of workshop instructor.*

Graduate School of Business Administration

All courses carry three quarter-hours of credit unless otherwise specified. Please see the current schedule for summer, fall, winter, and spring quarter listings.

ACC 3301 Financial and Managerial Accounting

Examines and evaluates financial and managerial processes to develop the participant's ability to request, use, and supply financial information. Includes financial statement analysis, funds flow, cost behavior, budgeting, capital investment analysis, and management control systems. *For nonbusiness majors.*

ACC 3811 Financial Accounting

Introduces the accounting system and the techniques of recording, summarizing, and reporting the flow of financial information through the entity concerned. Presents an examination of the information flow process plus the necessary techniques for analysis and evaluation of the firm's potential in the light of historical data.

ACC 3812 Management Accounting

Examines appropriate use of accounting and nonfinancial data for decision-making in and controlling of a business. Analyzes cost behavior as it relates to volume and profit for operation decisions and use of cost data in capital investment decisions. Studies techniques to develop and use comprehensive budgets for planning, motivating, coordinating activities and monitoring performance of a business and its functional components. *Prereq. ACC 3811.*

ACC 3813 Management Control Systems

Studies management control system as a key technique to assist a firm in achieving its goals and objectives. Topics include the process of translating long- and short-term goals into operating budgets, measuring performance for reward systems and assisting in decision-making, and specific techniques for evaluating performance. Emphasizes decentralized organizations with multiple operating divisions. Addresses developing, evaluating, and improving existing management control systems to respond to the firm's environment and goals through readings and case analysis. *Prereq. ACC 3812.*

ACC 3903 Management Control in Nonprofit Organization

Uses lectures and case studies to help students develop an understanding of the role of the manager in the nonprofit control process, the design and implementation of a new control system, and the management of a system which will adapt to changing environments and organizational needs. Topics include the characteristics of bureaucratic behavior and problems associated with implementing a control system where it may not be desired and understood; and methods of defining and relating the inputs and outputs of nonprofit organizations, including the use of cost accounting, capital and program budgeting, personnel systems, and benefit/cost analysis. *Prereq. ACC 3813.*

ACC 3918 Corporate Financial Reporting and Analysis 1

Investigates contemporary financial reporting problems. Discusses conceptual and pragmatic issues of income determination and financial disclosure. Emphasizes interpretation and analysis of alternative accounting treatments. Topics include inventory methods, plant assets, and long-term debt. *Prereq. ACC 3812.*

ACC 3919 Corporate Financial Reporting and Analysis 2

Continues examination of the financial reporting environment. Analyzes the economic consequences of complex transactions and related disclosures. Surveys current reporting requirements and analysis of recent developments in financial reporting. Topics include stockholders' equity, earnings per share, pensions, and leases. *Prereq. ACC 3918.*

ACC 3922 Auditing

Introduces the function of the public accountant. Covers matters of professional conduct and ethics, legal liability, generally accepted auditing standards, internal control, statistical sampling, audit reports, and the impact of electronic data processing on auditing. Although a conceptual approach is employed, covers auditing procedures as they relate to specific areas. *Prereq. ACC 3812.*

ACC 3962 Tax Factors in Business Decisions 1

Surveys the Internal Revenue Code and its implications for choice of organizational form, corporate reorganizations, and compensation policies. Examines mergers and acquisitions and the management of depreciable property in the light of decisions made by the Internal Revenue Service and the tax courts. Emphasizes tax planning and research into corporate income tax problems that affect business decisions. *Prereq. 15 QH of graduate credit and ACC 3812.*

ACC 3963 Tax Factors in Business Decisions 2

Aims to establish an in-depth understanding of selected tax planning topics: deferred compensation plans, mergers and acquisitions, small business organization, and business planning interactions with estate planning. *Prereq. ACC 3962 or permission of instructor.*

ENT 3922 Small Business Consulting

Helps students who have completed courses in the major functional areas achieve insights into the consulting sector of our business society. Emphasizes tools used in problem identification and in seeking realistic solutions for the small business manager. Requires each student to be assigned to a team that will be applying these skills with a small business in an attempt to find solutions to a real, current problem. Requires a final written report and oral presentation of this consulting assignment. *Prereq. 15 QH of graduate credit.*

ENT 3929 New Venture Creation

Gives students the opportunity to build a complete business plan for a new, high-potential venture. Covers all aspects of planning, from the point of view both of the prospective entrepreneur and the potential investor. Emphasizes the demand of an entrepreneurial career through readings, self-assessment exercises, and group projects. Presents guest speakers from start-up companies and legal and venture capital firms to provide up-to-date business experiences. Recommended for prospective entrepreneurs and others whose career activities may involve new ventures. *Prereq. 15 QH of graduate credit.*

ENT 3965 Management of Small Business Enterprises

Presents the operating problems of managing small enterprises. Explores case studies that develop analytical approaches for appraising the risks and rewards of potential growth opportunities, as well as operating problems. Presents problems that range from locating, evaluating, marketing, and financing a small company to the survival and growth of an established business. Presents guest speakers who relate pertinent business experiences to in-class activities. *Prereq.* 15 QH of graduate credit.

ENT 3968 Management of New Enterprises

Designed for students who are interested in either starting or working for small businesses. Explores how clever, effective marketing is essential for the growth of small companies. Explores the creation of a company image and establishing business strategy through market research and competitive analysis techniques suitable for the small business. In the context of a term project, teaches the various dimensions of implementing effective marketing programs for a small business, the market research for which includes surveying prospective customers and investigating competitors and suppliers. Results in a marketing plan for a new venture. Includes class readings, case analyses, and guest speakers from industry. *Prereq.* 15 QH of graduate credit.

FIN 3301 Financial Analysis

Traces the flow of funds within an organization, working capital management, capital markets, capital budgeting, and financial analysis. Builds on topics covered in ACC 3301. *For nonbusiness majors.*

FIN 3760 International Financial Management

Deals with the specific concepts, policies, and techniques for the financial management of the multinational firm. Topics include operations of the foreign exchange markets, managing foreign exchange risk, sources and instruments of international financing, foreign direct investment and the management of political risk, multinational capital budgeting, and financing control systems for the multinational firm. *Prereq.* FIN 3812.

FIN 3770 Small Business Finance

Utilizes the basic processes, principles, tools, and concepts of finances within the parameters of a small business to develop a complete financial plan. Constructs a comprehensive plan that projects the future circular flow of funds by analyzing and then integrating the impact of both investment decisions (use of funds) and financial decisions (source of funds). *Prereq.* FIN 3812.

FIN 3811 Financial Management 1

Presents concepts, practices, and procedures of financial management, and offers training in analytical approaches helpful in making wise decisions affecting the flow of funds available to an organization. Topics include financial analysis and forecasting, domestic and international working capital management, and an introduction to security types and markets. Instruction is primarily through readings and cases. *Prereq.* ACC 3812 and MSC 3802.

FIN 3812 Financial Management 2

Concentrates on long-term sources and uses of funds, including capital budgeting techniques, dividend policies, and the concept of cost of capital. Studies risk and return trade-offs. Studies broad topics of overall financial strategy and timing both domestically and internationally. *Prereq.* FIN 3811.

FIN 3901 Financial Strategy

Covers the opportunity to study several important areas of financial management in greater depth than is possible in the basic finance courses. Emphasizes strategies that financial managers can pursue to maximize the value of their firms. Instruction is primarily through reading and classroom case discussions. *Prereq.* FIN 3812.

FIN 3916 Capital Investment Decision Analysis

Analyzes capital budgeting techniques and portfolio considerations combined with an assessment of factors affecting a firm's capital structure. Considers company assets and how they should be financed. Explores the most recent developments in financial management. *Prereq.* FIN 3812.

FIN 3918 Working Capital Management

Examines strategies of and analytical approaches to managing current assets and current liabilities. Explores corporate cash management under changing money market conditions and discusses the use of interest rate futures and working capital management in a multinational context. *Prereq.* FIN 3812.

FIN 3920 Real Estate Investment and Analysis

Helps provide students with a comprehensive understanding of real estate finance. Emphasizes factors affecting real estate investment. Topics include valuation (appraisal), market analysis, development, taxation, ownership types, short-term financing, mortgage markets, and investment strategies. Designed for students interested in a general overview of real estate finance, as well as those intending to pursue a career in the real estate field. *Prereq.* FIN 3812 and MSC 3803.

FIN 3921 Investment Analysis

Focuses on the development of a sound investment program, with attention to identification of investment principles, objectives, and risks. Emphasizes the techniques of analysis, evaluation of various types of securities and the associated risks, the operation of the securities markets, and methods of portfolio management. *Prereq.* FIN 3812.

FIN 3923 Business Turnarounds

Concentrates on the diagnosis, prescription, and implementation of actions pertinent to business turnarounds, troubled companies, workouts, bankruptcies, and liquidations. Guides the student through the maze of financial, ethical, legal, general business, and strategic aspects of turnarounds by considering case studies and readings. Culminates in the student evaluating and developing a turnaround plan. *Prereq.* FIN 3811.

FIN 3924 Mergers and Acquisitions

Studies the environments that have recently given rise to a large number of corporate mergers and the business factors underlying these corporate combinations. Examines the financial, managerial, accounting, and legal factors affecting mergers. Teaches how to appraise a potential merger and structure a merger on advantageous terms. *Prereq.* FIN 3812.

FIN 3925 Investment Banking

Presents issues associated with policy, strategy, and administration of investment banking firms. Topics include issuance of securities, the service function of investment bankers, pricing a negotiated issue of common stock or competitive bid issue, and meeting capital requirements of a securities firm. *Prereq.* FIN 3812.

FIN 3926 Bank Management

Uses case studies and analyses to examine the management policies of commercial banks. Focuses on the lending, investment, and liquidity management policies of these financial institutions and the current issues and problems faced. *Prereq.* FIN 3812.

FIN 3927 Portfolio Management

Deals with portfolio construction, revision, and performance measurement. Highlights portfolio construction in an efficient capital market. Explores risk-return analysis, the effects of diversification on risk reduction, and the costs of inflation, taxes, and transaction costs of fixed income and equity security portfolios. Examines financial models of capital asset pricing as the basis for the analysis of portfolios from the institutional investor's viewpoint. *Prereq.* FIN 3921.

FIN 3928 Risk Management and Insurance

Introduces the concepts of risk and risk bearing in the business firm. Examines risk identification and analysis, measurement of loss possibilities, and the principal methods of managing such contingencies. Includes some nontraditional areas, such as speculative risk and foreign operations. Discusses insurance in detail as a major method of managing certain types of risks. Stresses aspects that directly relate to the financial management function, such as insurance markets and products, selecting insurers and insurer intermediaries, legal frameworks involved in the transfer of risk to insurers, pricing of insurance contracts, and principles followed by insurers in selecting risks. *Prereq.* FIN 3812.

FIN 3930 Speculative Markets

Familiarizes the student with all aspects of speculative markets, including options, futures, and options on futures. Uses readings and case problems to study when and how to use speculative market instruments. *Prereq.* FIN 3921.

FIN 3935 Management of Financial Institutions

Offers a broad study of the decision-making problems faced by financial institutions such as commercial banks, thrift institutions, pension funds, insurance companies, and finance companies. Topics include the nature and scope of the capital markets confronting these institutions, specialized problems regarding their sources and uses of funds, the nature of the competition,

regulatory constraints, and strategic policy planning of the financial institutions. *Prereq.* FIN 3812.

FIN 3950 Management of Investor Relations

Explores the scope and nature of the investor relations function. Describes various target audiences, reviews financial disclosure requirements, and discusses the effectiveness of various financial communication techniques. Focuses on the workings of the capital markets and the factors affecting a firm's stock price from the standpoint of the investor relations manager. *Prereq.* FIN 3812.

HRM 3301 Organizational Behavior

Serves as a critical component in preparing for increased responsibilities in the management of human resources. Studies leadership, group dynamics, motivation, power, business ethics, organizational structure, and change. Emphasizes practical application of specific skills, theories, and concepts. *For nonbusiness majors.*

HRM 3760 Managing People in International Settings

Covers basic issues in human resources management relevant to managing in international and cross-cultural environments. Topics include selection and training of personnel for work in multicultural environments, managing the international employee in the United States and abroad, cross-cultural communication, international environments, special issues of concern to small business, and change in multinational companies. *HRM 3815 and HRM 3816.*

HRM 3784 Human Resource Management in Health Organizations

Relates the traditional personnel (human resource management) functions: service, audit and control; the new functions: corporate policy formulation planning, advice and counsel, and innovation to the unique problems of health care organizations. Uses union organization and negotiation efforts, in cases and mock negotiation exercises, to focus on the conflicting issues between traditional personnel approaches, and the questioning of management authority and rights by unions and other regulatory policies and agencies. *Prereq.* HRM 3815 and HRM 3816.

HRM 3815, HRM 3816 Behavioral Concepts and Organizational Behavior 1

The first half of this two-course sequence involves major concepts and findings of the behavioral sciences that have particular pertinence to business and administration. Systematic ways of understanding behavior are developed. Specific topics include motivation, interpersonal perception and communication, and small groups processes. The second half of the course sequence relates these basic concepts to specific aspects of behavior in formally constituted organizations. Supervisory behavior is examined in the behavioral context, as well as in relations between groups, in efforts to develop ways of achieving collaboration.

HRM 3817 Organizational Behavior 2

Expands the study of behavior in organizations in order to understand and deal systematically with the complex relationships found in larger organizations. Provides an opportunity to apply knowledge about people

in organizations to the improvement of organizational systems and to the process of achieving changes in organizations. *Prereq.* HRM 3815 and HRM 3816.

HRM 3913 Managing Power and Influence

Explores through cases, readings, and videotape the complex issues involved in the use of power and influence in organizations and how to manage these issues in ways that are organizationally effective and socially responsible. Topics include the dynamics of power within organizations; the methods by which effective managers acquire and maintain power to manage critical dependencies and uncertainties; the important interdependency between power, influence and trust in organizations; analysis and action planning around one's own style of influence and use of power; the effects of these issues upon one's own career. *Prereq.* HRM 3815, HRM 3816, and 15 QH of graduate credit.

HRM 3920 The Management of Innovation

Innovation is the process of turning ideas into useful procedures or products. Students explore what the manager can do to foster, control, and direct innovation to accomplish the company's goals. Topics include the process of innovating, the role of the manager, and the selection of organization designs and systems that are some of the key components of innovation. *Prereq.* HRM 3815 and HRM 3816.

HRM 3945 Training and Developing Human Resources

Aimed at management generalists and human resource specialists who are concerned with maintaining organizational effectiveness through the upgrading of the basic skills and abilities of a broad range of employees. Emphasizes diagnosis of the organization to assess whether training and development is needed; techniques to decide who needs training; developing an awareness of the many types of training methods and their relative strengths and weaknesses for various groups of employees, and problem areas; and the design, implementation, and evaluation of training programs. *Prereq.* HRM 3815 and HRM 3816.

HRM 3948 Organization Development

Studies a recognized management discipline that uses behavioral science knowledge, action research, and specific intervention techniques to implement planned organizational change. Explores the relative advantages of strategies such as team building, process consultation, goal setting, conflict resolution, and structural modification. *Prereq.* HRM 3815, HRM 3816, and 12 QH of graduate credit.

HRM 3955 Compensation Management

Covers policies and techniques of wage and salary administration. Allows students to design and implement compensation plans using case data. Covers the technical aspects of developing a successful compensation program such as determining, weighing, and measuring compensable factors; assigning a total value to a job; grade collapsing procedures, reviewing wage and salary surveys; synchronizing internal with external salary structure; setting up "within grade" rate ranges; developing individual and group incentive compensation plans; developing group membership

rewards; estimating labor costs; controlling and utilizing the compensation systems and complying with government and union compensation policy. Uses cases and readings in a lecture/class discussion format. *Prereq.* HRM 3815 and HRM 3816.

HRM 3987 Leadership

Studies the processes and responsibilities of leadership in organizations. Uses a contingency approach that focuses on identifying different types of leadership behavior and on relating particular leadership styles to situational factors. Includes text, readings, and cases that allow for application of the concepts discussed and self-assessment techniques that allow the student to evaluate his or her own leadership qualities. *Prereq.* HRM 3815 and HRM 3816.

INB 3910 Managing the Multinational Enterprise

Deals with international operations at the multinational enterprise; the interface between the firm and the international business environment; current issues in United States public policy affecting international business competition with Japan and with LDCs. *Prereq.* MEC 3809.

INB 3911 Cultural Aspects of International Business

When a firm moves from its home culture to a host culture abroad, managerial issues become more complex. Managers enter negotiations and make contracts with counterparts whose goals and expectations may be quite different. Topics include strategies for assessing national cultures effectively, negotiation techniques, and case analysis of problems in various cultures. Primary focus will be on the perspective of the United States manager abroad with secondary focus on non-United States managers operating in foreign nations. *Prereq.* 15 QH of graduate credit.

MEC 3808 Managerial Economics 1

Presents macroeconomics for business managers. Acquaints students with the general economic environment and its impact on the firm. Topics include income and employment theory; classical, Keynesian, and monetarist models; aggregate demand and supply systems; money and capital markets; business cycles and the firm.

MEC 3809 Managerial Economics 2

Entails the application of microeconomic principles to the business firm and its competitive environment. Uses cases and readings to demonstrate the practical application of economic models in the decision-making process. Covers demand analysis, production and cost analysis, market structure, and pricing practices. *Prereq.* MEC 3808 and MSC 3803.

MGT 3750 Writing for the Professions

Examines the various forms of business communications and offers practical experience in writing business letters, memoranda, case studies, proposals, and reports. When possible, presents speakers from business and industry to address the class on various problems encountered in management and executive level communications. Requires several short (500-word) papers as well as one or two longer reports.

MGT 3834 Strategic Management 1

Focuses on the environment in which strategy must be formulated in profit and nonprofit organizations. Includes techniques of environmental analysis, with particular emphasis on the political-legal, economic, social, and technological environments as they relate to and influence the formulation of strategy. *Prereq.* All required courses with the exception of ACC 3813, HRM 3817, MGT 3835, and MGT 3836.

MGT 3835 Strategic Management 2

Building on the materials presented in MGT 3834, examines strategy formulation. Emphasizes the process by which strategy is formulated in actual business settings, including the influence of personal values on strategy formulation, who actually makes strategic decisions, what environmental and internal information is required to make strategic decisions, and what criteria are used to make the decisions. Considers the role of different management levels in the process. *Prereq.* MGT 3834.

MGT 3836 Strategic Management 3

Compares and contrasts the approaches to strategy implementation in profit and nonprofit organizations. Topics include organizational structure and behavior, long-range planning, control and motivation systems, information systems, and leadership. Considered within the systems framework of organizational strategy. *Prereq.* MGT 3835.

MGT 3915 Business and Professional Speaking

Designed to give the students an opportunity to develop and deliver oral presentations as they apply to various business settings—focus is on formal as well as informal speaking situations. Stresses helping the student develop skills in dealing with a variety of communication situations. *Prereq.* 15 QH of graduate credit.

MGT 3917 Managerial Communication

The ability to communicate effectively is an important dimension of managerial success. This course deals with a variety of communication contexts and emphasizes improving skills in each context. Students may have the opportunity, through simulations and exercises, to develop individual skills.

MGT 3919 Interpersonal Communication

Explores ways in which we relate to other individuals and factors that influence these processes. Through class discussion, readings, and individual and group projects, examines effective listening behaviors, small group/conference techniques, leadership styles, and methods of team-building. *Prereq.* 15 QH of graduate credit.

MGT 3939 United States Competitiveness in a Global Economy

Explores the distinctive problems of formulating and implementing strategy in global businesses. Discusses and analyzes new trends affecting the international competitiveness of United States firms and possible responses. Encourages participants to view problems from the perspective of foreign firms and foreign governments, in addition to those of United States firms

and the United States government. Covers a range of economic sectors and countries. Requires students to work on an in-depth project. *Prereq.* MGT 3834 and MGT 3835.

MGT 3940 The Chief Executive Officer

Focuses on the job perspective of the chief executive officer of business organizations. Focuses on presentations by and discussions with chief executives of major companies in the Greater Boston area. Includes case studies and other literature addressing the job, problems, and opportunities of top managers. Enrollment will be limited. *Prereq.* 30 QH of graduate credit.

MGT 3970 Business and Society: Managing Social Issues

Analyzes environmental influences—economic, legal, technical, social, cultural, and ethical—affecting the corporation. Focuses on reconciling the strains generated by these external factors and their impact on managerial decision making. *Prereq.* HRM 3816 and 12 QH of graduate credit.

MGT 3971 Ethics in Management

Is business ethics intrinsically a contradiction in terms? We will examine—through cases, contemporary issues, and theoretical concepts—whether ethical analysis can and should be applied to managerial decisions. While philosophical ideas will be discussed, this is not so much a presentation of those schools of thought or an attempt to establish prescriptive norms for business. Rather, we will apply moral reasoning to real situations in an effort to decide whether business can conduct itself in ways that are both profitable and proper.

MGT 3973 Business and Government Regulation

Studies the process by which regulations are formulated at the various levels of government and the impact on business: the regulation of prices, safety, environment, energy, and consumer rights. Emphasizes particular industries: transportation, communication, energy, health care, and finance. Attempts to enhance the ability of managers to respond to and deal with government regulation, which today significantly affects most aspects of business.

MGT 3975 Introduction to Health Care Systems

Explores the current state of the system, dealing with its history and process, and describing the parts of the delivery system, the payers, the consumers, the manpower, and the policy implications. Includes comparison of health care systems, lectures, discussions, and readings. Recommended for those entering the field. *Prereq.* 15 QH of graduate credit.

MGT 3976 Cases in Health Care Finance and Operations

Examines decision making in health organizations emphasizing financial considerations, the effect of government regulation, and third party reimbursement policies. Uses frequent case studies to present financial statement analysis, financing decisions and resource allocation, including new program and facility development. Requires students to prepare cases and to take part in class discussions. *Prereq.* ACC 3812 and FIN 3811.

MGT 3977 Health Care Delivery Systems

Introduces graduate management students to the United States health care delivery system by presenting an overview of its parts while providing and understanding of the interrelational dynamics and, at times, conflicting goals. Highlights the interaction between the health care delivery system and the external environment, including the changing viewpoints, issues, and major social trends.

MGT 3986 Health Care Strategic Marketing

Focuses on how health care organizations are increasingly turning to strategic planning and marketing to achieve objectives. Examines the strategic planning process in hospitals and other provider institutions and the complementary activities of marketing personnel. Explores the role of key constituents—such as, patients, trustees, senior managers, and medical staff—in strategic planning and marketing activities showing how the process of competitive analysis and internal organization evaluation and restructuring are key elements for success.

MGT 3991 Legal Aspects of Business

Provides an understanding of the American legal system with an emphasis upon the resolution of corporate legal disputes by means of civil litigation, mediation, arbitration, and the corporate mini-trial. Examines the traditional areas of contract law and tort law as they relate to problems confronting the modern corporate manager. Scrutinizes the legal structure of the corporation and focuses upon agency issues, computer law, and the preservation of intellectual property. Reviews government regulation of business including anti-trust law and labor law.

MGT 3997 Special Studies in Business Administration 1 QH

Offers a special tutorial arrangement between a student and a faculty member for a guided reading, research, laboratory, fieldwork, report, or teaching experience. Recommended for graduate students who desire to do advanced work or carry out special investigation of a problem in business administration not specifically covered in the curriculum. Requires students to petition the Committee on Graduate Study in Business Administration for permission to register for this course. *Prereq.* 15 QH of graduate credit.

MGT 3998 Special Studies in Business Administration 2 QH

See MGT 3997 for course description.

MGT 3999 Special Studies in Business Administration

See MGT 3997 for course description.

MKT 3301 Marketing

An organization's link to its market is a crucial aspect of the management process. This course begins with market analysis and market research and builds on the planning framework examining product, pricing, advertising, sales management and distribution. For nonbusiness majors.

MKT 3760 International Marketing

Helps students develop understanding of the opportunities and challenges facing the international marketing executive; the decision-making process in marketing goods abroad; and the environmental forces—economic, cultural and political—affecting the marketing process in the international marketplace. Includes lectures, discussions, reports, and cases. *Prereq.* MKT 3812.

MKT 3811 Marketing Management 1

Presents the student with a comprehensive examination of basic marketing functions, institutions, and concepts; and helps develop the student's ability to analyze and make recommendations about business problems that involve the creation, distribution, and sale of goods and services. Emphasizes the definition of marketing problems, demand analysis, consumer analysis, and marketing research.

MKT 3812 Marketing Management 2

Continues MKT 3811, with emphasis on the formulation and implementation of marketing strategy. Stresses product policy, channels of distribution, pricing, advertising, personal selling, and the development of integrated marketing programs of action. *Prereq.* MKT 3811.

MKT 3914 Consumer Behavior

Offers development of an understanding of consumer attitudes and behavior processes. Examines and evaluates various economic and behavioral models of consumer behavior as bases for the planning and evaluation of marketing strategies. *Prereq.* MKT 3812.

MKT 3916 Workshop in Negotiating

Helps improve the students' understanding of the negotiations process and their ability to plan and conduct negotiations effectively. Involves readings, lectures, and discussions as well as numerous case discussions and live and videotaped role-play negotiation exercises. *Prereq.* MKT 3812 and HRM 3816.

MKT 3922 Brand Management

Emphasizes the process of new consumer product development, the management and development of product strategies, and management of the product mix in the multiproduct firm. Topics include identification and screening of new product opportunities, evaluation of product performance, segmenting the product market, diversification and simplification of the product line, and the management of innovation. *Prereq.* MKT 3812.

MKT 3926 Advertising Management

Explores management of the advertising function from the perspective of users such as product managers. Uses case studies and text materials to explore the role of advertising, target market identification, creative strategies, media planning, and advertising evaluation. Emphasizes coordination of advertising with marketing elements and overall corporate strategy. *Prereq.* MKT 3812.

MKT 3931 Marketing Research

Discusses major methods of marketing research. Emphasizes research design issues—sampling, data

collection procedures, and questionnaire construction—rather than data-analysis procedures. Examines sources of error in surveys in detail, along with the appropriate methodological techniques designed to reduce their magnitude. Evaluates surveys in terms of their ability to provide quality information. *Prereq.* MKT 3811 and MSC 3802.

MKT 3932 Statistical Methods for Marketing Research

Focuses on various statistical methods of design and analysis in marketing research. Topics include non-parametric statistics, experimental design, correlation and regression analysis, multiple discriminant analysis, and factor analysis. Uses canned statistical programming routines with actual survey data to illustrate the application of the methods discussed. This course may be taken independently of MKT 3931. *Prereq.* MKT 3811 and MSC 3802.

MKT 3934 New Product Development

The importance of new products to the survival and prosperity of firms increases as product life cycles become shorter, as technology, competition, and consumer tastes change; and as operating costs increase. For most firms, coping with the problems of environmental change through modification of the product line is vital and difficult. This course will have as a primary concern the examination and analysis of some of the problems firms face in directing and managing their new product development activities. *Prereq.* MKT 3812.

MKT 3936 Retail Management

Analyzes the evolution of retail institutions and examines selected major strategy and policy problems of food, apparel, and general merchandise retailers. Explores cases and issues from the viewpoint of the managements of supermarket, department store, specialty store, and discount enterprises. Designed primarily for students interested in retailing and those concerned about the role of mass distributors in marketing consumer goods. *Prereq.* MKT 3812.

MKT 3940 Defense Marketing

Conducted in a seminar format, with emphasis upon defense marketing in its totality, including analysis of participant roles, contractual foundations, contractor performance, and marketing activities. Topics include the overall defense acquisitions process, market characteristics, program management, procurement methods, sales and negotiation techniques, and related marketing management factors. *Prereq.* MKT 3812.

MKT 3941 Industrial Marketing

Considers the problems of industrial concerns in marketing products and services to industrial, business, and organizational customers. Emphasizes determining customers' needs and developing programs to satisfy these needs. Topics include the roles and responsibilities of the marketing executive engaged in industrial distribution advertising, and research, as well as roles and responsibilities of industrial salespeople, sales supervisors, and selling agents. *Prereq.* MKT 3812.

MKT 3945 Sales Management

Helps develop the decision-making skills necessary to build and maintain an effective sales organization.

Uses cases and readings to examine the strategic and operating problems of the sales manager. Topics include the selling function; sales management at the field level; the sales executive; and sales and marketing management. *Prereq.* MKT 3812.

MKT 3952 Marketing for Nonprofit Organizations

Explores the extension of marketing concepts, practices and principles to organizations outside the business sector. Applies marketing methods to nonprofit organizations such as governmental agencies, educational institutions, charitable organizations, social cause agencies, and political candidates. Emphasizes the development of integrated marketing plans for the various nonprofit organizations. *Prereq.* MKT 3812.

MKT 3955 Marketing in High-Tech Industries

Offers study for students who already have a good background in marketing but who are now interested in analyzing the special marketing problems that high-tech industries pose. Topics include the use of market research when customer preferences are not yet developed, the use of sales and service forces, and the use of marketing as a strategic variable. *Prereq.* MKT 3811.

MKT 3966 Marketing in the Service Sector

Deals with public and private profit and nonprofit institutions which market services. Includes insurance, transportation, utilities, entertainment, health care, education, religious, sports, banking, artistic, and protective. Combines case discussions, textbooks, and outside readings for a balanced approach for the development of marketing skills. Defines, classifies, and analyzes service characteristics from the perspective of their effect on marketing methods and institutions. *Prereq.* MKT 3812.

MKT 3975 Health Care Marketing

As the health service environment becomes increasingly competitive and complex, health service organizations use sophisticated marketing tools to identify and manage marketing opportunities and distribution strategies. Students will examine different health service marketing applications in the context of service marketing through case analysis, readings, and a project. Specific marketing techniques will be addressed within a strategy framework. *Prereq.* 15 QH of graduate credit.

MKT 3978 Competitive Strategy

Serves as a capstone course for graduate students emphasizing the marketing area in their studies. Pulls together the various functional, institutional, and strategic elements that marketing comprises and to which the student has been exposed in previous coursework. *Prereq.* MKT 3812.

MSC 3301 Operations

Explores the strategic nature of operations planning. Stresses capacity planning, quality control, product liability, production scheduling and control. Highlights the interdependence of sound financial planning, effective marketing strategies and corporate decision making. *For nonbusiness majors.*

MSC 3780 Operations Management in Health Care Organizations

Hospitals and other health services organizations provide costly, varied, and sophisticated human and capital resources to maintain and improve the lives of those served. The operations management function in health organizations encompasses planning, coordinating, and controlling these complex resources in order to satisfy, at reasonable costs, current and anticipated client needs. The concepts, tools, techniques, applications, and cases appropriate to a discussion of the planning and control of efficient, effective, and equitable health services organizations are presented. Topics include capacity planning, facility location, forecasting, process and job simulation and quality control. Designed for individuals interested in careers in health care administration. *Prereq.* MSC 3805.

MSC 3802 Quantitative Analysis 1

Examines the process of statistical inference, whereby the analyst is enabled to infer or draw conclusions about the parameters of a large data set on a basis of sample statistics. Topics include the generation of subjective probabilities, the revision of probabilities to incorporate new information, and the incorporation of probabilities into the decision-making framework.

MSC 3803 Quantitative Analysis 2

Introduces the theory and practice of management science. Discusses regression analysis, linear programming, and simulation in text and case material. Stresses practical application of the techniques. Considers problem definition, model building, relevant cost determination, solution generation, and implementation of results. *Prereq.* MSC 3802.

MSC 3805, MSC 3806 Operations Management 1, 2

Helps develop an understanding of the management of operating systems. Examines the design, operation, control, evaluation, and modification of systems that produce goods and services. Attempts to increase the student's decision-making capabilities in technical areas and develop an appreciation for the operations manager's job, and provide an understanding of interrelations with other functional areas. Topics include design of product and process, capacity planning, line balancing, work measurement, job evaluation, network scheduling, production planning, inventory management, production scheduling and control, and quality control. MSC 3805 concentrates on the design of the operating system; MSC 3806 focuses on its operation and control. *Prereq.* For MSC 3806, MSC 3803.

MSC 3832 Introduction to Computer Applications

Provides a business-oriented introduction to data processing functions and systems. Introduces history, terminology, technology, and economics of data processing hardware and software. Considers management issues in the design, selection, evaluation, and use of computers and computer services. Offers individual familiarization with personal computers and popular business software. *Prereq.* Satisfactory completion of computer programming requirement.

MSC 3909 Quality Management and Control

Focuses on the need for quality assurance in both the manufacturing and service sectors, the technical and statistical tools used in quality assurance, and the concept of total quality. Topics include the history of quality assurance in the United States and Japan; managerial issues related to quality assurance, including the concept of total quality control, the role of quality as a strategic tool, and human resource factors in the management of quality; and managing and controlling quality in service industries. *Prereq.* MSC 3802.

MSC 3910 Decision Analysis

Decision analysis is a discipline for systematic evaluation of alternative actions. In selecting among alternative strategies, the decision maker must consider future events and subsequent actions that could exert a significant influence on the consequences of selecting a given strategy; the likelihood of each such event occurring; the consequence associated with the occurrence of each such event in conjunction with the action alternative being evaluated; and the relative desirability of each consequence. The process for quantifying each of these and dealing with their interrelationships is examined within the unifying framework of the decision tree. *Prereq.* MSC 3802.

MSC 3911 Manufacturing Policy

Focuses on strategic operating decisions typically addressed by the vice president of manufacturing operations, such as capacity expansion, the impact of new products and/or processes, product allocation to plants, and vertical integration. Emphasizes how these decisions impact the competitive position of a firm both now and in the future, which helps the students understand the totality of a top management situation where the interactions between corporate and manufacturing strategies are most evident. Includes case studies, reference notes, and articles. Recommended for students who currently are in, or expect to be in, positions of major responsibility in manufacturing/operations, and also for students who must possess the qualifications to analyze the manufacturing capabilities of companies, such as those in investment banking, finance, and consulting. *Prereq.* MSC 3806.

MSC 3912 Contemporary Issues in Manufacturing Management

Considers recent significant developments in manufacturing technology and their managerial implications. Provides an understanding of modern manufacturing systems and their associated operations management problems, and to develop the decision-making ability necessary for the effective management of such systems. Topics include automation, group technology, just-in-time production, and computer-integrated manufacturing. Includes lectures, reading cases, and a field project. *Prereq.* MSC 3806.

MSC 3914 Performance Criteria and Incentive Systems

Presents the stages required for implementing an effective performance criteria system in an organization: selecting performance criteria, measuring performance, and establishing standards. Describes various financial incentive systems to increase motivation for

improved performance. Reviews individual, group, and organizational incentive systems. Participants may be able to design and implement systems by the end of the quarter. *Prereq.* MSC 3805.

MSC 3916 Competitiveness in Manufacturing Operations
Takes an integrated and global approach toward manufacturing in order to formulate strategies for higher profit, higher quality, and lower inventory and operating costs. Analyzes different types of firms and manufacturing problems using lectures, readings, cases, and a term project. *Prereq.* MSC 3806.

MSC 3922 Data Analysis

Analyze small and large data sets in the context of a model and graphical methods. Emphasizes the dual goals of data analysis: discovering hidden interesting features of data and how such characteristics affect the estimates of model parameters. Introduces students to new and novel methods of computer-intensive methods in statistics. Requires analysis and interpretation of data sets related to students' field of interest. *Prereq.* MSC 3802 and MSC 3803.

MSC 3933 Management Information Systems

Deals in depth with the analysis, design, implementation, and operation of modern management information systems. Uses case studies as the primary vehicle to illustrate all phases in the creation and management of computer-based systems. Emphasizes management issues rather than computer technology or programming. Designed to follow MSC 3832, this is a logical second computer course that an MBA candidate might take. *Prereq.* MSC 3832.

MSC 3936 Database Management Systems

Provides management-oriented introduction to database management systems (DBMS). Topics include rationale for the DBMS approach, database design, data models, DBMS software tools, conversion to a database environment, and the role of the database administrator. Allows students to use a DBMS package, gain experience in database design, use a query language, and develop DBMS applications. *Prereq.* MSC 3832.

MSC 3940 Data Communications for Managers

Presents a nontechnical introduction to data communications for the general manager. Improves the manager's knowledge of critical aspects of this rapidly expanding and increasingly important field. Surveys the most important aspects of modern local and remote communications systems. Topics include fiber optics, microwave transmission, networking, and switching. Gives students the opportunity to design several prototype communications configurations. *Prereq.* MSC 3832.

MSC 3963 Expert Systems

Familiarizes the student with the potential of expert systems (ES) for management problem-solving. Topics include the position of ES in the larger field of artificial intelligence, components of an ES, various levels of languages for ES construction, determination of problem areas suitable for the application of ES technology, analysis of several existing ES applications, and future potential for this technology. Uses case and readings.

Teaches one of the most popular ES languages. Includes a project on one of several aspects of ES application. *Prereq.* MSC 3832 or MSC 3933.

TRN 3903 Corporate Transportation/Logistics

Focuses on the design and management of corporate transportation and logistics systems. Emphasizes the analytical framework which is employed in making complex distribution tradeoffs. Topics include inventory control, location analysis, transportation planning, and the integration of logistics planning with other functional aspects of the organization. *Prereq.* 15 QH of graduate credit.

Graduate School of Computer Science

All courses carry four quarter-hours of credit unless otherwise specified. All courses have COM 1201 Data Structures as a prerequisite, in addition to those listed.

COM 3112 LISP**2 QH**

Introduces computer scientists to LISP, emphasizing the use of LISP in artificial intelligence.

COM 3114 "C"/UNIX Laboratory**2 QH**

Introduces "C" programming language. Studies reading and writing the language, learning to use UNIX commands and application programs, and UNIX system calls and subroutines.

COM 3115 PROLOG**2 QH**

Covers PROLOG syntax, data structures, backtracking and "cut", debugging, applications, and the relation of PROLOG to logic.

COM 3200 Computer Architecture

Studies the design of digital computer system components, including the arithmetic and logic unit, the control unit, the memory and memory controller, and interconnection networks. Explores modern design techniques for increasing computer system capacity. Topics include pipelining, cache, RISC architecture model, multiprocessing and parallel processing architectures, systolic systems, dataflow architecture, and associative memories. *Prereq. COM 3336*

COM 3205 The Software Life Cycle

Presents a comprehensive review of the software development field. Examines the "software crisis" and the need for methods and software lifecycle paradigms such as waterfall, prototyping, executable specifications, and incremental development. Discusses requirements analysis, specification methods, software design principles and methods and software verification testing. Explores project management, cost estimation, metrics, implementation issues, document design, and maintenance. Emphasizes data abstraction and module integration. Includes a project covering the requirements specification, design, and coding phases of software development. Provides initial documentation that is text-based, with CASE tools introduced later.

COM 3210 Software Specification, Design, and Maintenance

Focuses on issues of documenting and modifying large programs, possibly written by others. Uses CASE tools for analyzing and documenting a large software system. Emphasizes differing design representations and conveying the inner working of a complex software system. Reviews data abstraction and object-oriented programming. Emphasizes also debugging tools, including dbx, make, lint, tags, and RCS, or their equivalent in a non-UNIX environments. A typical project generates CASE-based documentation for preexisting software and uses the documentation to design and add enhancements. *Prereq. COM 3205*.

COM 3220 Software Testing, Verification, and Validation

Studies unit testing, including functional testing and its relationship to the specification, structural testing, and error-oriented testing and analysis. Discusses managerial aspects of unit testing and analysis. Examines verification and validation, including objectives, theoretical limitations, integration and system testing, and regression testing. Considers simulation and prototyping, requirements tracing, proof of correct-

ness, code reviews, and planning for verification and validation. Reviews formal verification methods, including Hoare logic, weakest preconditions, and others. *Prereq. COM 3205*.

COM 3315 Database Systems

Considers the concepts and structures necessary to design and implement a database application. Introduces to database concepts, database modeling, and hierarchical, network, and relational models. Topics include data definition and manipulation languages, design theory for relational models, integrity, security, recovery, and concurrency in database systems.

COM 3316 Physical Database Engineering

Studies the specification, design, and implementation of database management systems. Discusses the access characteristics of secondary storage devices, and analyzes primary and secondary access methods for performance of database operations and for storage space. Topics include query optimization methods, hashing techniques, lock tables, search structures, sorting methods, and techniques to evaluate design alternatives and tradeoffs. Requires a project involving physical database structures. *Prereq. COM 3315*.

COM 3317 Data Modeling

Presents the theoretical foundations of existing and proposed database systems. Considers the semantics of database systems and data modeling. Introduces the theory of normalization, logic databases, knowledge bases, and object-oriented databases. *Prereq. COM 3315*.

COM 3329 Topics in Database Management

May be repeated for credit. *Prereq. Permission of instructor.*

COM 3336 Operating Systems 1

Studies the design and implementation of an operating system. Reviews algorithms for concurrent processes, deadlock resolution, process management, performance evaluation, and monitoring. Students work on a project implementing a small operating system or extending an existing one. *Prereq. COM 1130*.

COM 3337 Operating Systems 2

Continues COM 3336. The first part of this course will continue to study the design and implementation of operating systems through the examination of a specific system. In the second part of the course, more emphasis will be placed on operating systems in general and a variety of solutions to the central problems in the field will be studied and compared. Topics covered may include memory management, scheduling, mutual exclusion, deadlock, disk drivers, interprocess communication, and file systems. Students will be expected to carry out a substantial project involving modification of an existing operating system. *Prereq. COM 3336*.

COM 3349 Topics in Operating Systems

May be repeated for credit. *Prereq. Permission of instructor.*

COM 3350 Theory of Computation

Studies partial recursive functions and recursively enumerable sets, turing-decidability, and unsolvable problems. Discusses computational complexity, the class P and NP, and some NP-complete problems. *Prereq.* COM 3390 and either COM 1350 or COM 3345.

COM 3351 Principles of Programming Languages

Considers the basic components of programming languages, including specification of syntax and semantics. Presents the derivation of languages processors from their specifications, and describes programming language features. Includes examples from a variety of languages.

COM 3355 Compiler Design

Explores the basic components of compilers, with an emphasis on using a standard compiler-writing tool such as yacc, tws, or ssl. Thus, parsing is not a major part of this course. Writing a small compiler using the compiler-writing tool may be required. Topics include an overview of the stages of compilation, attribute grammars, symbol tables, abstract syntax trees, run-time structure, and code generation. *Prereq.* COM 3351.

COM 3356 Optimizing Compilers

Studies the code generation phase of compilers, with emphasis on production of efficient object code. Topics include immediate code representations, flow analysis, local and global optimization, peephole optimization, register allocation, and methods for code generator generation (table-driven code generation, Graham-Glanville techniques, etc.). *Prereq.* COM 3355.

COM 3357 Semantics of Programming Languages

Offers the mathematical models for the behavior of programming languages, including reading and writing denotational specifications. Considers the lambda-calculus, and emphasizes the practical use of the techniques covered, such as rapid prototyping and debugging specifications. *Prereq.* COM 3351.

COM 3360 Object-Oriented Systems

Discusses the basic components of object-oriented systems: programming languages that support the object-oriented paradigm, object-oriented databases, and their interfaces. Considers methodologies for developing applications with object-oriented systems, as well as design space for object-oriented programming languages. Reviews the maintenance and evolution of object-oriented applications. Includes programming assignments using a widely available object-oriented programming language. *Prereq.* COM 3351.

COM 3370 Advanced Computer Graphics

Discusses selected topics chosen from the following list: area fill algorithms, aliasing problem in line drawing, three-dimensional graphics, geometric transforms, hidden surface algorithms, curve and surface approximation techniques, solid primitives, color and shading, approaches to obtaining realistic images. *Prereq.* An introductory course in computer graphics.

COM 3371 Digital Image Processing

Studies the fundamental concepts of digital image processing, including digitization and display of im-

ages, manipulation of images to enhance or restore image detail, encoding (compression) of images, detection of edges and other object features in images, and the formation of computed tomography (CAT scan) images. Introduces mathematical tools such as linear systems theory and Fourier analysis and uses them to motivate and explain these image processing techniques.

COM 3390 Analysis of Algorithms

Examines the design and analysis of fast algorithms. Topics are chosen from the following list: advanced data structures (representing partitions, union-find algorithms, priority queues) graph algorithms (bi-connectivity, maximum flow, shortest path, matching, minimum spanning tree) algebraic problems (matrix multiplication, polynomial multiplication, string matching, linear programming) probabilistic algorithms (tests for primality, factoring polynomials and integers). *Prereq.* MTH 1137.

COM 3399 Topics in Programming Languages and Systems
May be repeated for credit. *Prereq.* Permission of instructor.

COM 3410 Foundations of Artificial Intelligence

Studies searching, goals, plans, and heuristics. Examines representation of knowledge, including frames, nets, and inheritance. Explores logic and its role in artificial intelligence, and selected applications of these ideas in other areas of artificial intelligence. *Prereq.* Working knowledge of LISP (same as MTH 3522).

COM 3411 Methods of Artificial Intelligence

Offers hands-on experience in the development and use of AI tools such as: search with backtracking (chronological, dependency-directed) and heuristic search, blackboard models, default reasoning, inference engines (unification and resolution), object-oriented programming (flavors and Loops), procedural attachment, plan-generate-test in problem solving, production systems, rule spaces, distributed representations, augmented transition networks and their compilation. *Prereq.* COM 3410.

COM 3420 Knowledge Representation and Inferencing

Presents knowledge representation, acquisition, and utilization. Considers frames, scripts, conceptual dependency, forward and backward chaining, unification and resolution, and non-monotonic reasoning. Includes rote learning, learning by analogy, consistency checking. *Prereq.* COM 1410 or equiv.

COM 3425 Logic in Artificial Intelligence

Focuses on formal logic as related to intelligence and human reasoning, and gives a brief review of the formal properties of "standard" logic. Discusses logic in artificial intelligence systems and languages, as well as limitations of standard logic as a model of intelligent behavior. Studies extensions of standard logic including modal/temporal logics, fuzzy logic, logic of action and belief, non-monotonic logic, and intensional logic. *Prereq.* COM 3411.

COM 3430 Expert Systems

Introduces expert systems and how to build them. Focuses on techniques and tools, classical systems, and research in automated methods. Assignments intro-

duce students to various languages and tools. Requires a project or term paper. *Prereq.* COM 3410.

COM 3440 Natural Language Processing

Investigates the goals and problems of Natural Language Processing (NLP) and studies the grammatical models and associated parsing algorithms. Considers models of natural language semantics: case grammar, semantic networks, formal logic, and frames. Discusses current research on models of discourse, speech act planning, and robust parsing methods. Examines some implemented systems for NL understanding. *Prereq.* COM 3410.

COM 3450 Syntactic Pattern Recognition

Introduces syntactic pattern recognition and comparison with the classical discriminant approach. Surveys various syntactic pattern recognition techniques, such as PDL, array grammar, formal languages, tessellation structures. Examines syntax analysis as a recognition procedure and grammatical inference for recognition. Considers applications to selected problems in industry, commerce, medicine, and robotics. *Prereq.* COM 1350 or COM 3345.

COM 3460 Intelligent Computer-Assisted Instruction

Analyzes the notion of course material independent of teaching procedures. Explores problems and comments individualized for each student, and system tutors with reactive learning environments. Includes examples for SCHOLAR and GUIDON, and group development of intelligent instructional systems.

COM 3470 Computer Vision

Discusses low-level vision. Develops methods that assemble the low-level elements into coherent wholes based on models of scenes using world knowledge in the appropriate domains. Topics include classification, robot vision, moving image analysis, and cognitive models of vision (gestalt effects, texture perception, subjective contours, illusions, apparent motion and mental rotations, cyclopean vision, etc.). *Prereq.* COM 3410.

COM 3480 Connectionist Models of Learning

Considers machine learning, focusing on connectionist, or neural network, models. Topics may include the notion of "concept," perceptions and their limitations, linear machines, and the pocket algorithm. Other topics may include distributed representations, the credit assignment and learning in networks, Boltzmann machines, Rumelhart's back propagation algorithm, tower construction, sequences, the neocognitron of Fukushima, and connectionist expert systems. Requires preparation of either a project or a term paper. *Prereq.* COM 3410.

COM 3499 Topics in Artificial Intelligence

May be repeated for credit. *Prereq.* Permission of instructor.

COM 3510 Computer Communications Networks: Design and Performance

Studies interacting computers. Topics include elementary queueing theory, connectivity theory, data link and transport protocols, slot rings, token rings and CSMA, routing algorithms, and performance analysis

of networks. Additional topics may be chosen from models of networks or of network protocols, error detection and correction, and applications protocols such as virtual terminal or file transfer protocols. *Prereq.* MTH 1137.

COM 3520 Cryptography and Computer Security

Presents the design and use of cryptographic systems and cryptanalytic attacks and provides a history of cryptographic systems and the mathematics behind them. Considers shift register sequences, random number generators, DES, as well as public key systems and their applications. *Prereq.* COM 1350, and COM 3345 or MTH 1137.

COM 3560 Distributed Database Systems

Addresses the problems and opportunities inherent in high performance and distributed database systems. Considers the concurrency control and recovery management methods, methods for improving performance and availability, and the management of replicated data. *Prereq.* COM 3315.

COM 3630 Concurrent Programming

Explores the logical problems that arise in concurrency and their machine implementations. Considers mutual exclusion, message passing, deadlock, monitors, kernels, and applications to operating systems. *Prereq.* COM 3336.

COM 3640 Parallel Algorithms

Studies algorithms and theories for parallel computation on fixed-connection networks and on concurrent systems having a fixed number of processors. Focuses on algorithms for sorting, priority queues, graph algorithms, matrix multiplication, and FFT. Students use a network for micros to implement some of these algorithms. May include applications to VLSI design. *Prereq.* COM 3336 and COM 3390.

COM 3699 Topics in Computer Architecture and Hardware

May be repeated for credit. *Prereq.* Permission of instructor.

COM 3710 Automata and Formal Languages

Examines formal models of computation and regular expressions. Discusses the properties of regular sets, context-free languages and pushdown automata, Chomsky hierarchy, and computability and undecidability. *Prereq.* MTH 1137 (same as MTH 3521).

COM 3730 Complexity Theory

Presents the theory of relationships among complexity classes of algorithms. Examines sequential, deterministic, parallel, non-deterministic, and probabilistic models of computation, as well as turing and decision tree models. Considers the class NP, and addresses questions of completeness, especially NP-completeness, reducibility, and hierarchy of complexity classes. *Prereq.* COM 3350 (same as MTH 3535).

COM 3741 Algebraic Algorithms

Offers topics in algebraic algorithms chosen from the following list: computational group theory, computational number theory, algorithms for computing with

finite fields, and the discrete Fourier Transform and its applications. Other topics may include the Knuth-Bendix algorithm for finitely presented algebras, polynomial factorization, and related topics in computer algebra (*same as MTH 3514*).

COM 3761 Numerical Analysis 1

Surveys the problems, issues, and techniques of numerical analysis. Considers problems such as root finding, curve fitting, numerical integration, large linear systems of equations, and ordinary differential equations. Addresses such issues as tradeoffs, for example, cost versus precision and speed versus space. Requires some programming. *Prereq. FORTRAN or Pascal (same as MTH 3361)*.

COM 3762 Numerical Analysis 2

Studies the numerical solution of partial differential equations, emphasizing elliptic equations and the finite element method. *Prereq. COM 3761 (same as MTH 3362)*.

COM 3799 Topics in Theoretical Computer Science

May be repeated for credit. *Prereq. Permission of instructor.*

COM 3800 Readings in Computer Science

Offers selected readings under the supervision of a faculty member. *Prereq. Core courses and permission of instructor.*

COM 3805 Readings in Computer Science 2 QH

Requires selected readings under the supervision of a faculty member. *Prereq. Core courses and permission of instructor.*

COM 3810 Special Topics in Computer Science

Faculty will lecture on current topics in computer science. Topics will vary from quarter to quarter. May be taken up to three times for credit, with changes in topics. *Prereq. Core courses or permission of instructor.*

COM 3820 Computer Science Master's Thesis

May be repeated for credit. *Prereq. Agreement of a thesis adviser.*

COM 3821 Computer Science Master's Thesis 0 QH

Continues COM 3820.

COM 3830 Computer Science Master's Project

May be repeated for credit. *Prereq. Agreement of a project supervisor.*

COM 3840 Seminar in Computer Science

Provides an opportunity to read and present various survey and research papers in computer science. Faculty supervisor and topics will vary from quarter to quarter. May be repeated for credit. *Prereq. Core courses or permission of instructor.*

COM 3890 Computer Science Doctoral Thesis

COM 3891 Computer Science Doctoral Thesis

Continues COM 3890.



Graduate School of Criminal Justice

The following course descriptions are representative of the courses offered in the Graduate School of Criminal Justice. As it is not possible to offer all courses each year, students are urged to consult the most current announcement of course offerings for specific information regarding available courses in any given quarter. All courses described here carry three quarter-hours of credit except as noted.

CJ 3201 The Criminal Justice Process

Introduces graduate students to the operation of the criminal justice system. Covers the components of the system, the process by which defendants are moved through that system, and key issues in the administration of criminal justice.

CJ 3202 Theories of Criminology

Focuses on the use of scientific methods in the study and analysis of regularities, uniformities, patterns, and causal factors related to crime, the criminal, and social reactions to both. Analyzes critical contributions to the study of crime, criminals, and the treatment of offenders from writings in such disciplines as biology, psychology, psychiatry, endocrinology, law, sociology, and anthropology.

CJ 3203 Criminal Law

Discusses the fundamental principles and concepts of criminal law in the United States. Focuses on the relationship of the individual to the state and includes an examination of the general framework of criminal law.

CJ 3251 Criminal Justice Planning and Development

Analyzes developing public and private sector criminal justice organizational strategy and the role of planning in such processes. Studies techniques both for strategy development and planning. Considers annual budget and long-range planning. Explores elements and means of evaluating strategy and relates them to changes currently occurring in criminal justice agencies and institutions.

CJ 3252 Criminal Justice Management

Introduces skills used for implementing and managing organizational strategy in public and private sector criminal justice organizations. Focuses on organizational structure and culture, and managing personnel processes. Examines leadership and the special role it plays in establishing organizational goals, as well as developing the means required to obtain those goals. Analyzes both internal and external management skills and contrasts their relative importance in public and private sector organizations.

CJ 3253 Personnel and Labor Relations in Criminal Justice

Introduces basic skills in personnel management, selection, and placement. Develops an understanding of the social psychology of organizations concerned with law enforcement, the courts, or corrections, and familiarity with critical issues in labor relations and collective bargaining.

CJ 3254 Budget and Financing in Criminal Justice

Studies the principles and practices of budgeting in the various functional areas of criminal justice. Considers financial operations, including obtaining resources through budget development and presentation. Draws distinctions between capital budgets and expense budgets and among zero budgeting, line-item budgeting, and program budgeting. Discusses important financial concerns such as cost effectiveness, management by objectives, and critical path method (CPM). Gives special attention to budget projections as planning tools for obtaining grants, as well as a means of facilitating

needed change within the present structures of criminal justice agencies. Other topics include the utility of budgets as evaluative mechanisms is stressed, and the role of budgeting in the financial control of organizations.

CJ 3301 Administration of Private Security

Examines private security theories, operations, and practices, with special emphasis on the administration and management of security. Considers the philosophical background, history, and current role of private security are explored, as well as the role and status of the security manager in threat assessment, risk prevention, and the protection of assets. Discusses functional-area security systems, law, science and technology for security, and issues, standards, goals, and challenges for the future. Studies security systems, particularly as these "open" systems related to criminal justice and the environment. Addresses the concept of the security manager as the prime mover toward professionalization and improved management and administration of security operations, and as the advocate of contemporary organizational theories embracing research and the systems approach.

CJ 3302 Law and Private Security

Studies the legal factors that affect security operations and administration and the value of legal counsel on such factors. Discusses factors such as the pertinent aspects of torts, agency, civil rights, contracts, trade secrets, insurance, and regulatory issues.

CJ 3303 Technological Security Systems

Considers security applications of the latest scientific and technological advances and the impact of new product developments on prevention and protection, detection, and prosecution. Assignments examine the state of the art of security products and planning, implementing, maintaining, and evaluating highly sophisticated security systems.

CJ 3304 Human Factors in Security

Analyzes topics and strategies for security administration. Investigates executive development, ethical issues, stress management, conflict management, crisis management, intra-organizational relations, community agency relations, promoting security awareness, staff development, and effective security personnel and product interface are addressed.

CJ 3351 Theories of Law and Society

Introduces theories, issues, and research related to law and legal institutions, placing law in the context of social control systems, raising basic issues about the nature of law, and focusing on the relationship between law and social values. Considers the nature of law, law and social change, the sociology of the legal profession, and criminal law in action. Examines the formulation of criminal law and discrimination in the formulation and practice of criminal law.

CJ 3352 Statistical Analysis 2

Continues CJ 3204. Discusses multiple regression and its extensions, discriminant analysis, factor analysis, analysis of variance, and the analysis of contingency tables. *Prereq.* CJ 3534.

CJ 3354 Criminal Behavior Systems

Increases an understanding of particular types of crime. Examines sociological approaches to the study of particular crime types and research findings on specific criminal behavior systems. Assignments require students to explore a criminal behavior system that particularly interests them.

CJ 3505 Juvenile Law and Children's Rights

Examines the legal relationship between the juvenile offender and the state. Covers case and statutory law, as well as constitutional due-process standards in juvenile proceedings. Topics include jurisdiction, prejudicial process, waiver of jurisdiction adjudication, disposition, and postdispositional issues, as well as the right to treatment.

CJ 3508 Quantitative Models in Criminal Justice

Explores quantitative frontiers in the field of criminal justice as well as the methodological contributions of allied fields. Discusses such approaches as reliability models of recidivism, stochastic models of criminal behavior, econometric models of the criminal justice system, and deterrence models. Requires reading extensively from published and unpublished literature.

CJ 3509 Crime Measurement

Analyzes the amount, distribution, and pattern of criminal behavior in the United States via official crime statistics including the Uniform Crime Reports, victimization surveys, and self-report studies. Reviews alternative measures including indices of seriousness of various offenses. Examines historical studies of the nature and extent of criminal behavior, and discusses problems and prospects regarding accurate measures of crime and crime correlates.

CJ 3511 Theories of Delinquency

Examines critically the major theoretical explanations of juvenile delinquency. Explores theoretical approaches including social disorganization, subcultural theory, strain, control theory, labeling and conflict theory. Discusses current data on the nature and distribution of delinquency, highlighting findings from empirical research.

CJ 3512 Penology and Corrections

Focuses on the major problems and issues in the American "correctional" system today. Covers theories of punishment, types of punishment, the history of and conditions in institutions for juveniles, men, and women. Considers the crisis in overcrowding brought on by recent sentencing "reforms", among other topics.

CJ 3513 Victimology

Examines critically theories and research regarding victims of crime, giving special attention to National Crime Survey victimization data. Discusses the fear of crime, victim vulnerability, and victim culpability. Assesses the implications of victim-oriented research for the administration of justice, as well as current programs offering victim services such as restitution and compensation. Analyzes future trends in theory, research, and public policy.

CJ 3514 Police Functions in Democratic Society

Examines the sociopolitical context within which American police departments developed in the nineteenth century as well as the changing forces that shape modern departments. Considers the implications of democratic institutions and traditions for policing in America. Contrasts the organization of several different kinds of departments and examines the implications of these different types of departments for police performance. The rigors of police work, together with the social-psychological adjustments that officers at different ranks make.

CJ 3515 Women and the Criminal Justice System

Examines the roles of women in the criminal justice system. Focuses on women as offenders, as victims, and as agents of social control. Discusses women's role in both theory and practice, and on both historical and contemporary issues.

CJ 3516 Criminal Courts in America

Examines the problems, policies, and practices of the criminal court system in the United States. Addresses topics such as the structure and organization of the court system, the role that criminal courts play in United States society, and the flow of cases from arrest to conviction. Emphasizes the lower criminal court, and issues concerning court management including personnel, juries, witnesses, and scheduling are reviewed. Presents court reform initiatives.

CJ 3517 Terrorism

Divided into two sections, the first part of which examines the sociology of terrorism, including funding, intelligence gathering, weapons and tactics, informers, and countermeasures. Pays special attention to the media that report the news, yet seem often perilously close to inciting further terror. Examines the "terrorist personality," the literary depiction of terrorism, and the doctrine of systematic terrorism, as well as its current interpretations and common patterns, motives, and aims. The second part concentrates on identifying technologies of counterterrorism, discussing incident management needs, and recommending ways to lessen the risk of nationally disruptive acts. Attempts to challenge accepted assumptions and to forecast changes in terrorist activities that may affect tomorrow's headlines.

CJ 3518 Issues in Juvenile Justice

Analyzes critically the policies and practices of agencies involved in processing young people through the juvenile justice system. Considers police practices, detention, intake, diversion, adjudication, and disposition of juveniles within the justice system. Focuses on the historical development of the juvenile justice system and assesses current trends and proposals for reform.

CJ 3524 Theories of Punishment

Introduces theories and issues in punishment with a focus on topics of contemporary interest as well as the historical roots of current approaches. Considers trends and fashion in both the theory and the form of punishment. Draws reading materials from a variety of fields, including philosophy, politics, literature, law, and empirical criminal justice.

CJ 3525 Correctional Administration

Offers intensive coverage of the many problems and dilemmas that confront the correctional organization. Topics include the basic problems of correctional organization, organizational development and analysis, management by objectives, planning and budgeting systems, management style and personnel development, special problems of jails and houses of corrections, institutional programs, classifications, correctional policy, and the future of imprisonment.

CJ 3531 White Collar Crime

Examines critically the current theoretical, research, and public policy issues regarding white collar crime. The first part examines definitions of white collar crime as well as various typologies of white collar crime activity. Assesses the nature, extent and consequences of white collar crime in the United States. Discusses explanations for the commission of these offenses. The second part uses case studies to explore in more detail white collar crime. For example, cases of employee theft, corporate crime, governmental deviance, industrial espionage, and computer crime will be presented and discussed. The third part focuses on controlling white collar crime. Examines the problems of traditional criminal justice systems in controlling white collar crime and assesses the prospects of alternative systems of control—civic law, private security, public opinion.

CJ 3532 Computer Applications in Criminal Justice 4 QH

Surveys computer applications in criminal justice research and administration. Introduces both mainframe and microcomputer methods and procedures. Mainframe topics include command language and editors; file creation, storage, and access; and statistical and database software. Microcomputer topics include operating systems, database managers, spread sheets, word processing, and mainframe relations.

CJ 3533 Research and Evaluation Methods 4 QH

Surveys the basic techniques of research and evaluation methods. Addresses various research strategies, including surveys, observation, archival data, experiments, and evaluation designs. Covers nontechnical, yet critical, issues such as ethical problems and the design, procedures, and politics of research, especially evaluations in criminal justice.

CJ 3534 Statistical Analysis 1 4 QH

Introduces probability and statistical analysis. Topics include measures of central tendency and dispersion; probability and the binomial, Poisson, exponential, and normal distributions; sampling distributions and hypothesis testing; and correlation, regression, and forecasting.

CJ 3535 Civil Liability and Policy Development

Addresses the various issues of civil liability and policy development in federal, state, and local criminal justice agencies and their private counterparts in corrections and security. Examines the historical development of civil rights litigation and methods of risk response utilized by criminal justice and private agencies through the case study method. Covers the nature and growth of civil liability in policing, probation, corrections, pa-

role, municipal government, private corrections, and security by reviewing legal theories and cases. Emphasizes the development of policies and procedures designed to improve services and reduce liability risks associated with agency operations.

CJ 3801, CJ 3802 Directed Study 1, 2

An independent study offers the student the opportunity to bring individual, concentrated attention to a particular topic as arranged and agreed upon in advance by a faculty member and the student. This option is generally recommended when the student desires a more intensive analysis of a particular subject. The independent study has the advantage of allowing students flexibility in learning and developing their own academic programs. *Prereq.* Permission of graduate school director.

CJ 3803, CJ 3804 Internship 1, 2

Field instruction in a criminal justice agency where instruction may be offered through administrative, research, teaching and/or related activities. Students have the opportunity to apply theoretical concepts in a practical, applied fashion by observing and contributing to the daily activities of operating agencies and organizations. *Prereq.* Permission of graduate school director.

CJ 3805 Master's Thesis**6 QH**

Students electing to write a master's thesis must select a thesis topic with the advice of a faculty member and receive approval of the thesis topic from the graduate director. *Prereq.* Permission of graduate school director.

CJ 3806 Field Practicum Seminar

Offers a setting in which field practicum experiences can be discussed and analyzed as they relate to planning and management principles. By virtue of the field placement, the student may experience the routine activities of a public agency/organization. The seminar gives an opportunity to integrate the practical experience with the theoretical concepts. *Prereq.* Permission of instructor.

Graduate School of Engineering

Chemical Engineering

Each course description includes information on the quarter in which classes are usually offered. The quarters listed are presented for planning; however, the Graduate School of Engineering cannot guarantee that all courses will be offered. Students must refer to the Graduate School of Engineering Quarterly Course Offering sheets to determine what courses are actually offered in any given quarter.

CHE 3300 Chemical Engineering Mathematics 4 QH Fall Quarter, Alternating Years

Presents formulation and solution of problems involving advanced calculus as they arise in chemical engineering situations. Considers such methods as ordinary differential equations, series solutions, complex variables, Laplace transforms, partial differential equations, and matrix operations. Emphasizes methods for formulating the problems. Assumes that students have studied some of these topics in appropriate mathematics courses. *Prereq.* BS degree in chemical engineering, including mathematical analysis.

CHE 3301 Chemical Engineering Mathematics 2 QH Fall Quarter, As Announced

CHE 3301 and CHE 3302 cover the same material with the same prerequisites as CHE 3300, but in two 2 QH courses.

CHE 3302 Chemical Engineering Mathematics 2 2 QH Winter Quarter

Continues CHE 3301. *Prereq.* CHE 3301.

CHE 3310 Chemical Engineering Thermodynamics 4 QH 1 Winter Quarter, Alternating Years

Considers classical thermodynamics as a method of approach to the analysis of processes of interest to chemical engineers. Studies phase equilibria involving the various states of matter; predation and correlation of physical, chemical, and transport properties of gases and liquids; and elementary concepts of quantum and statistical mechanics to interpret the empirical properties of classical thermodynamics. Reviews fundamental principles. *Prereq.* BS degree in chemical engineering.

CHE 3311 Chemical Engineering Thermodynamics 1 2 QH Winter Quarter, as Announced

CHE 3311 and CHE 3312 cover the same material with the same prerequisites as CHE 3301, but in two 2 QH courses.

CHE 3312 Chemical Engineering Thermodynamics 2 2 QH Spring Quarter, As Announced

Continues CHE 3311. *Prereq.* CHE 3311.

CHE 3320 Separation Process 4 QH Spring Quarter, Alternating Years

Explores the calculation and design methods used in processes in-involving mass transfer. Topics include vapor liquid equilibria for binary and multicomponent systems, multicomponent distillation, absorption, and extraction. Emphasizes methods and techniques that are common to many separation processes. *Prereq.* BS degree in chemical engineering.

CHE 3321 Separation Processes 1 2 QH Winter Quarter, As Announced

CHE 3321 and CHE 3322 cover the same material with the same prerequisites as CHE 3320, but in two 2 QH courses.

CHE 3322 Separation Processes 2 2 QH Spring Quarter, As Announced

Continues CHE 3321. *Prereq.* CHE 3321.

CHE 3330 Chemical Process Control 4 QH Fall Quarter, Alternating Years

Reviews classical control techniques; state variable representation and analysis of continuous control systems in chemical engineering, including controllability, observability, and stability. Includes multivariable control problems in chemical engineering, an introduction to optimal control, and digital simulation included when appropriate. *Prereq.* Graduate standing in chemical engineering.

CHE 3331 Chemical Process Control 1 2 QH Fall Quarter, As Announced

CHE 3331 and CHE 3332 cover the same material with the same prerequisites as CHE 3330, but in two 2 QH courses.

CHE 3332 Chemical Process Control 2 2 QH Winter Quarter

Continues CHE 3331. *Prereq.* CHE 3331.

CHE 3340 Heterogeneous Catalysis 4 QH Winter Quarter, Alternating Years

Studies the experimental methods required for determining the surface area and pore structure of catalyst carriers. Explores the use of these structural characteristics to estimate mass and heat transport rates within porous catalyst in order to determine their effectiveness with respect to chemical reaction. Analyzes mechanisms for chemical poisoning of catalysts, and considers reactions of practical interest used to illustrate the applications of heterogeneous catalysis to modern chemical processing problems. *Prereq.* BS degree in chemical engineering.

CHE 3341 Heterogeneous Catalysis 1 2 QH CHE 3341 and CHE 3342 cover the same material with the same prerequisites as CHE 3340, but in two 2 QH courses.

CHE 3342 Heterogeneous Catalysis 2 2 QH Spring Quarter, As Announced

Continues CHE 3341. *Prereq.* CHE 3341.

CHE 3350 Chemical Process Heat Transfer 4 QH
 Spring Quarter, Alternating Years
 Presents empirical methods and calculations used to design heat transfer equipment for the chemical process industries. Reviews basic heat transfer principles, and studies shell-and-tube calculations for liquid and/or vapor phase heat transfer, direct contact, and other special heat exchanger applications. *Prereq.* BS degree in chemical engineering.

CHE 3351 Chemical Process Heat Transfer 1 2 QH
 Winter Quarter, As Announced
 CHE 3351 and CHE 3352 cover the same material with the same prerequisites as CHE 3350, but in two 2 QH courses.

CHE 3352 Chemical Process Heat Transfer 2 2 QH
 Spring Quarter, As Announced
 Continues CHE 3351. *Prereq.* CHE 3351.

CHE 3400 Advanced Chemical Engineering 4 QH
 Calculations
 As Announced
 Offers the fundamental process principles leading to an understanding of the stoichiometric principles of chemical process plants. Studies complex material and energy balances with the view to applying these principles to actual large chemical plant conditions. *Prereq.* BS degree in chemical engineering, including differential equations.

CHE 3401 Advanced Chemical Engineering 2 QH
 Calculations 1
 As Announced
 CHE 3401 and CHE 3402 cover the same material with the same prerequisites as CHE 3400, but in two 2 QH courses.

CHE 3402 Advanced Chemical Engineering 2 QH
 Calculations 2
 As Announced
 Continues CHE 3401. *Prereq.* CHE 3401.

CHE 3410 Numerical Techniques in Chemical 4 QH
 Engineering
 Fall Quarter, As Announced
 Examines digital computer applications to chemical engineering problems. Topics include location of roots of linear and nonlinear equations, numerical integration, and curve-fitting techniques with emphasis on the numerical solution of ordinary and partial differential equations and to the subject of linear algebra. *Prereq.* BS degree in chemical engineering.

CHE 3411 Numerical Techniques in Chemical 2 QH
 Engineering 1
 Fall Quarter, As Announced
 CHE 3411 and CHE 3412 cover the same material with the same prerequisites as CHE 3410, but in two 2 QH courses.

CHE 3412 Numerical Techniques in Chemical 2 QH
 Engineering 2
 Winter Quarter, As Announced
 Continues CHE 3411. *Prereq.* CHE 3411.

CHE 3430 Chemical Data Estimation 4 QH
 As Announced
 Explores methods of obtaining physical and thermodynamic properties of chemical compounds and systems without resorting to laboratory investigation. Introduces latest empirical relationships and physical and thermodynamics laws to obtain data for plant design and other chemical and engineering uses. *Prereq.* BS degree.

CHE 3431 Chemical Data Estimation 1 2 QH
 Fall Quarter, As Announced
 CHE 3431 and CHE 3432 cover the same material with the same prerequisites as CHE 3430, but in two 2 QH courses.

CHE 3432 Chemical Data Estimation 2 2 QH
 Winter Quarter, As Announced
 Continues CHE 3431. *Prereq.* CHE 3431.

CHE 3450 Analytical and Numerical Techniques 4 QH
 As Announced
 For students interested in solving comprehensive problems using computer methods. Problems solved in the course will be based on the interest of the students and staff and will be individual. *Prereq.* BS degree and knowledge of digital computer programming.

CHE 3500 Transport Phenomena 4 QH
 Winter Quarter, As Announced
 Presents and solves momentum rate conservation equations for steady-state fluid flow in two-dimensional boundary layers to obtain the fluid velocity profiles. Uses the solutions to consider heat and mass transfer phenomena at a fluid-solid interface. Applies the development of surface renewal theory to the description of heat and mass transfer phenomena. *Prereq.* BS degree in chemical engineering.

CHE 3501 Transport Phenomena 1 2 QH
 Winter Quarter, As Announced
 CHE 3501 and CHE 3502 cover the same material with the same prerequisites as CHE 3500, but in two 2 QH courses.

CHE 3502 Transport Phenomena 2 2 QH
 Spring Quarter, As Announced
 Continues CHE 3501. *Prereq.* CHE 3501.

CHE 3510 Modeling and Simulation of Chemical 4 QH
 Processes
 Winter Quarter, Alternating Years
 Explores the use of special purpose and general purpose computer programs in solving the steady-state material and energy balances of chemical processes. Discusses related background material that may be applied to these computer programs such as convergence acceleration for calculations involving recycle streams, tearing recycle streams for iteration on minimum number of streams and minimum number of parameters, and algorithms for design variable selection. *Prereq.* Graduate standing in chemical engineering.

CHE 3511 Modeling and Simulation of Chemical Processes 1 2 QH

Winter Quarter, As Announced

CHE 3511 and CHE 3512 cover the same material with the same prerequisites as CHE 3510, but in two 2 QH courses.

CHE 3512 Modeling and Simulation of Chemical Processes 2 2 QH

Spring Quarter, As Announced

Continues CHE 3511. *Prereq. CHE 3511.***CHE 3520 Computer Process Control 4 QH**

Winter Quarter, Alternating Years

Studies computer control hardware and software. Examines Z-transform, pulse transfer functions, and data holds. Topics include open and closed-loop response and design of sampled-data systems, computer control algorithms, and digital simulation of sampled data systems. *Prereq. Graduate standing in chemical engineering.*

CHE 3521 Computer Process Control 1 2 QH

Winter Quarter, As Announced

CHE 3521 and CHE 3522 cover the same material with the same prerequisites as CHE 3520, but in two 2 QH courses.

CHE 3522 Computer Process Control 2 2 QH

Spring Quarter, As Announced

Continues CHE 3521. *Prereq. CHE 3521.***CHE 3530 Advanced Management Techniques in the Chemical Industry 4 QH**

Fall Quarter

Focuses on management techniques applied to the chemical industry. Pays special attention to management of research organizations and to management of engineering services, such as design, computer, and related activities. *Prereq. Graduate standing.*

CHE 3531 Advanced Management Techniques in the Chemical Industry 1 2 QH

Fall Quarter, As Announced

CHE 3531 and CHE 3532 cover the same material with the same prerequisites as CHE 3530, but in two 2 QH courses.

CHE 3532 Advanced Management Techniques in the Chemical Industry 2 2 QH

Winter Quarter, As Announced

Continues CHE 3531. *Prereq. CHE 3531.***CHE 3540 Advanced Process Design Concepts 4 QH**

Spring Quarter

Stresses techniques and approaches used in the development of new or improved processes. Topics include establishment of process bases, use of process simulators in design, optimization and evaluation of alternatives, and preliminary equipment design and cost estimating techniques. *Prereq. BS degree in chemical engineering.*

CHE 3541 Advanced Process Design Concepts 1 2 QH

Fall Quarter, As Announced

CHE 3541 and CHE 3542 cover the same material with the same prerequisites as CHE 3540, but in two 2 QH courses.

CHE 3542 Advanced Process Design Concepts 2 2 QH

Winter Quarter, As Announced

Continues CHE 3541. *Prereq. CHE 3541.***CHE 3543 Advanced Plant Design Concepts 2 QH**

Spring Quarter, As Announced

Studies modern approaches to plant design: computer-oriented design, analysis and simulation of chemical processes, use of strategy decision making in design, advanced scheduling and planning techniques. *Prereq. BS degree in chemical engineering.*

CHE 3560 Fluid Mechanics 4 QH

Fall Quarter, Alternating Years

Discusses statics, kinematics, and stress concepts associated with fluids. Considers formation of the general equations of motion with application to laminar and turbulent flow. Topics include boundary layer theory and compressible flow. *Prereq. BS degree in chemical engineering.*

CHE 3561 Fluid Mechanics 1 2 QH

Fall Quarter, As Announced

CHE 3561 and CHE 3562 cover the same material with the same prerequisites as CHE 3560, but in two 2 QH courses.

CHE 3562 Fluid Mechanics 2 2 QH

Winter Quarter, As Announced

Continues CHE 3561. *Prereq. CHE 3561.***CHE 3600 Polymer Science 4 QH**

Fall Quarter

Studies the basic concepts of polymers, thermodynamics of polymer solutions and measurement of molecular weight. Examines the physical and chemical properties and testing of polymers. Investigates the crystallinity in polymers and rheology of polymers. Considers mechanisms and conditions for polymerization of polymers including step-reaction, addition, and copolymerization. Discusses carbon-chain polymers, fibers, and fiber technology. *Prereq. BS degree in chemical engineering or chemistry.*

CHE 3601 Polymer Science 1 2 QH

Fall Quarter, As Announced

CHE 3601 and CHE 3602 cover the same material with the same prerequisites as CHE 3600, but in two 2 QH courses.

CHE 3602 Polymer Science 2 2 QH

Winter Quarter

Continues CHE 3601. *Prereq. CHE 3601.***CHE 3620 Principles of Polymerization 4 QH**

Fall Quarter

Introduces polymers and polymer properties, focusing on mechanisms of polymerization including step polymerization, radical-chain polymerization, emulsion polymerization, ionic-chain polymerization, chain copolymerization, and ring-opening polymerization. Examines the stereochemistry of polymerization and synthetic reactions of polymers, and studies applications to reactor design of industrially important polymers. *Prereq. Graduate standing in chemical engineering.*

- CHE 3621 Principles of Polymerization 1** 2 QH
Fall Quarter
CHE 3621 and CHE 3622 cover the same material with the same prerequisites as CHE 3620, but in two 2 QH courses.
- CHE 3622 Principles of Polymerization 2** 2 QH
Winter Quarter, As Announced
Continues CHE 3621. *Prereq. CHE 3621.*
- CHE 3630 Chemical Process Pollution Control** 4 QH
Spring Quarter, Alternating Years
Provides chemical engineering students with the fundamentals for handling environmental problems in the chemical process industries. Studies water quality requirements and industrial waste characteristics, wastewater treatment processes applicable to environmental engineering, and biological treatment processes and equipment. Discusses comprehensive design problems involving biological and tertiary treatment, and the economics of water treatment and reuse. *Prereq. Graduate standing in chemical engineering.*
- CHE 3631 Chemical Process Pollution Control 1** 2 QH
Winter Quarter
CHE 3631 and CHE 3632 cover the same material with the same prerequisites as CHE 3630, but in two 2 QH courses.
- CHE 3632 Chemical Process Pollution Control 2** 2 QH
Spring Quarter
Continues CHE 3631. *Prereq. CHE 3631.*
- CHE 3659 Solar Energy Thermal Processes** 2 QH
Fall Quarter
Covers fundamental thermal processes involved in obtaining useful heat from flat-plate solar collectors. Analyzes the components required in an active solar energy collection system and considers the economics of the system. *Prereq. BS degree.*
- CHE 3663 Fundamentals of Polymer Processing** 4 QH
Winter Quarter
Presents the transport properties of polymer solutions and polymer melts. Discusses modeling and design of polymer processing equipment, as well as flow models for processes involving heat, mass, and/or momentum transfer. Topics include the analysis flow stability and elastic phenomena, and applications to the design of equipment for extrusion, calendaring, coating, fiber spinning, tular film blowing, injection molding and mixing. *Prereq. Graduate standing in chemical engineering.*
- CHE 3664 Fundamentals of Polymer Processing 1** 2 QH
Winter Quarter
CHE 3664 and CHE 3665 cover the same material with the same prerequisites as CHE 3663, but in two 2 QH courses.
- CHE 3665 Fundamentals of Polymer Processing 2** 2 QH
Spring Quarter
Continues CHE 3664. *Prereq. CHE 3664.*

- CHE 3670 Special Topics in Chemical Engineering** 4 QH
As Announced
Topics of interest to the staff member conducting this class are presented for advanced study. A student may not take more than one special topics course with any one instructor. *Prereq. Permission of department staff.*
- CHE 3671 Kinetics of Chemical Processes** 4 QH
Spring Quarter, Alternating Years
Presents the theoretical foundations for the analysis of elementary chemical reaction rates, such as collision theory, particle dynamics, and transition state theory. Considers the theory of monomolecular reactions and the effect of solvent and electrostatic forces on liquid phase reaction rates. Covers homogeneous catalysis and selected free-energy correlations. *Prereq. BS degree in chemical engineering.*
- CHE 3672 Kinetics of Chemical Processes 1** 2 QH
Winter Quarter
CHE 3672 and CHE 3673 cover the same material with the same prerequisites as CHE 3671, but in two 2 QH courses.
- CHE 3673 Kinetics of Chemical Process 2** 2 QH
Spring Quarter, As Announced
Continues CHE 3672. *Prereq. CHE 3672.*
- CHE 3680 Corrosion Fundamentals** 2 QH
As Announced
Studies economic factors, basic theories, types, behaviors of specific systems, and protection against corrosion. Wherever possible, engineering applications of the principles are emphasized. *Prereq. BS degree.*
- CHE 3691 Seminar** 2 QH
Any Quarter
Offers advanced topics presented by staff, outside speakers, and students in the graduate program. This course must be attended by all master's degree candidates. *Prereq. Graduate standing in chemical engineering.*
- CHE 3701 Special Topics In Chemical Engineering 1** 2 QH
Any Quarter
Offers advanced topics presented by a staff member. A student may take this course and its continuation in CHE 3702 with the same instructor.
- CHE 3702 Special Topics In Chemical Engineering 2** 2 QH
Any Quarter
Continues CHE 3701.
- CHE 3796 Doctoral Thesis Continuation** 0 QH
Any Quarter
- CHE 3798 Master's Thesis Continuation** 0 QH
Any Quarter
- CHE 3799 Doctoral Thesis Continuation** 0 QH
Any Quarter

| | |
|--|-------|
| CHE 3860 Master's Thesis Any Quarter | 10 QH |
| Analytical and/or experimental work conducted under the supervision of the department. Ten QH maximum credit for thesis. Students normally register in CHE 3861 or CHE 3862. <i>Prereq.</i> Graduate standing in chemical engineering. | |
| CHE 3861 Master's Thesis Any Quarter | 4 QH |
| CHE 3862 Master's Thesis Any Quarter | 2 QH |

| | |
|--|------|
| CHE 3880 Doctoral Thesis Any Quarter | 0 QH |
| Theoretical and experimental work conducted under the supervision of the department. <i>Prereq.</i> Admission to doctoral program in chemical engineering. | |
| CHE 3885 Doctoral Thesis Any Quarter | 0 QH |
| Theoretical and experimental work conducted under the supervision of the department. <i>Prereq.</i> Admission to program in chemical engineering. | |

Civil Engineering

Each course description includes information on the quarter in which classes are usually offered. The quarters listed are presented for planning; however, the Graduate School of Engineering cannot guarantee that all courses will be offered. Students must refer to the Graduate School of Engineering Quarterly Course Offering sheets to determine what courses are actually offered in any given quarter.

| | |
|---|------|
| CIV 3131 Engineering Statistics 1 Fall Quarter | 2 QH |
| Introduces the basic elements of probability theory and statistics and their use via the solution of various civil engineering problems encountered in fluid mechanics, construction management, structures, transportation. Discusses the probability of events, random variables and distributions, derived distributions, expectation, and common probability models. <i>Prereq.</i> Undergraduate calculus. | |
| CIV 3132 Engineering Statistics 2 Winter Quarter | 2 QH |
| Continues CIV 3131. Includes parameter estimation, confidence intervals, hypothesis testing, and linear statistical models. <i>Prereq.</i> CIV 3131. | |
| CIV 3134 Decision Analysis in Civil Engineering Spring Quarter | 2 QH |
| Studies the basic theory of decision-making under uncertainty, applied to design and managerial problems in civil engineering, feasibility analysis and construction (for example reservoir capacity design, dam safety options, to build or not to build a drainage system, flood levee design, economic analysis of construction projects, value engineering, construction method selection in tunneling). Covers decision trees, value of perfect information, value of sample information, multi-criteria decision making, and multi-attribute utility theory. <i>Prereq.</i> CIV 3131. | |
| CIV 3136 Performance and Safety Evaluation in Civil Engineering Spring Quarter | 2 QH |
| Focuses on the application of reliability to the design and analysis of civil engineering facilities. Discusses the reliability of redundant systems such as indeterminate structure. Examines statistical distributions of system parameters (for example, component strengths, flow rates, soil strengths) and demands (for example | |

seismic loading, traffic volumes). Topics include safety indices, load factors, reliability based design codes, and damage evaluation and reliability prediction of civil engineering facilities. *Prereq.* CIV 3131.

| | |
|--|------|
| CIV 3141 Numerical Methods in Civil Engineering 1 Fall Quarter, Alternate Years | 2 QH |
| Discusses errors in numerical analysis, solution of nonlinear algebraic equations by direct and iterative methods, and introduction to matrix eigenvalue problems. Examples are drawn from structural mechanics. <i>Prereq.</i> Admission to Graduate School of Engineering. | |

| | |
|--|------|
| CIV 3142 Numerical Methods in Civil Engineering 2 Winter Quarter, Alternate Years | 2 QH |
| Continues CIV 3141. Presents the approximation of functions: interpolation, and least squares curve fitting, and orthogonal polynomials. Covers numerical differentiation and integration; solution of ordinary and partial differential equations, and integral equations; and discrete methods of solution of initial and boundary-value problems. Examples are drawn from structural mechanics, geotechnical engineering, hydrology, and hydraulics. <i>Prereq.</i> CIV 3141. | |

| | |
|---|------|
| CIV 3161 Systems Analysis 1 Fall Quarter | 2 QH |
| Applies linear optimization models to various civil engineering problems: the simplex method, sensitivity analysis, transportation problem, transshipment problem, and shortest path problem. <i>Prereq.</i> Admission to Graduate School of Engineering. | |

| | |
|--|------|
| CIV 3162 Systems Analysis 2 Winter Quarter | 2 QH |
| Applies systems analysis techniques to civil engineering problems: dynamic programming, linear regression, model estimation, queuing theory, and project evaluation. <i>Prereq.</i> CIV 3131 and CIV 3161; taken concurrently with CIV 3132. | |

CIV 3171 Seminar in Public Works 1 2 QH**Winter Quarter**

Discusses the history and role of public works in development, including historical development, economic, and financial dimensions of public works in city and state government, technological change, local, regional, and national planning. Considers public works capital development, including political, economic, financial, social, administrative, and technical factors. *Prereq. Admission to Graduate School of Engineering.*

CIV 3172 Seminar in Public Works 2 2 QH**Spring Quarter**

Studies public works applications in management science, including such topics as applications of benefit/cost, cost-effectiveness, allocation, models, decision theory, queuing theory, and simulation. Discusses maintenance management including inventory, performance standards, scheduling, budgets and finance. Examines the public works planning issues of environmental assessment, techniques of land use planning and procedures, facility location, and resource utilization. *Prereq. CIV 3171.*

CIV 3231 Construction Management 1 2 QH**Fall Quarter**

Examines cost estimating, including a description of computerized cost estimating systems and duration estimating, considering work analysis techniques. Topics include value engineering as a concept and its effect on the construction industry, and specifications, including the use and importance of computerized Specification Writing Systems. *Prereq. Admission to Graduate School of Engineering.*

CIV 3232 Construction Management 2 2 QH**Winter Quarter**

Considers the application of scheduling methods to the control of construction activities, including resource allocation, quality control, cash flow progress reporting, and the effects of change orders. *Prereq. CIV 3231.*

CIV 3237 Construction Methods and Equipment 1 2 QH**Fall Quarter**

Discusses typical approaches to construction in a selection of application areas such as steel and concrete structures, hydraulic and port facilities, horizontal construction and the like. *Prereq. Admission to Graduate School of Engineering.*

CIV 3238 Construction Methods and Equipment 2 2 QH**Winter Quarter**

Continues CIV 3237, treating additional areas of construction. *Prereq. CIV 3237.*

CIV 3241 Legal Aspects of Civil Engineering 2 QH**Fall Quarter**

Presents United States and international legal systems and theories necessary for the comprehension of business and contractual liabilities, rights and obligations in the engineering field. *Prereq. Admission to Graduate School of Engineering.*

CIV 3242 Legal Aspects of Civil Engineering 2 2 QH**Winter Quarter**

Offers a description and evaluation of various types of construction contracts, procedures and formats for submitting bids, filing claims, and legal steps to avoid liabilities, utilizing the principles learned in CIV 3241. *Prereq. CIV 3241.*

CIV 3245 Construction Seminar 2 QH**Spring Quarter**

Focuses on reading and discussing recent research publications in construction engineering. *Prereq. Limited to Construction Management Program majors; taking in final spring quarter.*

CIV 3250 Project Evaluation and Financing 2 QH**Fall Quarter**

Reviews project evaluation techniques, as applied to construction and infrastructure projects. Studies bond pricing mortgage analysis, construction loan analysis in the development process, and valuation of income-producing properties. Considers project financing packages in the areas of real property and infrastructure. Examines the impact of financing on project value, and Capital Budgeting Models and their applications to infrastructure planning. *Prereq. Concurrent with ACC 3811.*

CIV 3252 Construction Project Control and 2 QH**Organization****Winter Quarter**

Discusses the organization of construction firms, both at the general corporate level and at the project level. Considers organization dynamics designed to respond to the requirements of the environment given the internal constraints of the firm. Introduces computer systems for the control of construction projects, emphasizing design attributes to fit the needs of the organization and the end users. Explores the estimating, scheduling, budgeting, and financial control of projects. Topics include network-based systems for planning and time control, intra-project and inter-project resource allocation, and database design concepts for decision support systems. *Prereq. CIV 3161.*

CIV 3310 Environmental Chemistry 1 2 QH**Fall Quarter**

Reviews basic chemistry and discusses the equilibrium chemistry of homogeneous and heterogeneous systems with applications in environmental engineering. Studies the physical and chemical properties of water, as well as acidity, alkalinity, hardness, and water softening. Topics include receiving water quality and disinfection. *Prereq. Two quarters of general chemistry.*

CIV 3311 Environmental Chemistry 2 2 QH**Winter Quarter**

Continues CIV 3310, including the basic principles of new chemical thermodynamics, electrochemistry, kinetics, organic chemistry, biochemistry, and nuclear chemistry as they relate to environmental engineering. Discusses colloidal chemistry and coagulation, and fundamental water quality parameters such as BOD, COD, and TOC. *Prereq. CIV 3310; taken concurrently with CIV 3325.*

CIV 3312 Environmental Chemistry 1, 2 4 QH
Fall Quarter
 Embodies the material in CIV 3310 and CIV 3311.
Prereq. Two quarters of general chemistry.

CIV 3315 Water and Wastewater Treatment 1 2 QH
Fall Quarter
 Examines design principles and theory for pretreatment, sedimentation, coagulation, flocculation, chemical softening, filtration, activated carbon absorption, and disinfection. *Prereq.* Undergraduate fluid mechanics courses.

CIV 3316 Water and Wastewater Treatment 2 2 QH
Winter Quarter
 Continues CIV 3315, including design principles involved in various biological treatment systems, oxygen transfer systems, solids thickening, aerobic digestion, and anaerobic treatment systems. *Prereq.* CIV 3315 and CIV 3323.

CIV 3317 Advanced Wastewater Treatment 3 2 QH
Spring Quarter
 Explores operational and design principles involved in sludge dewatering, biological nitrification and denitrification, phosphorus removal, and other advanced treatment methods. *Prereq.* CIV 3316

CIV 3318 Water and Wastewater Treatment 1 and 2 4 QH
Fall Quarter
 Embodies the material in CIV 3315 and CIV 3316.
Prereq. Undergraduate fluid mechanics.

CIV 3321 Environmental Biological Processes 4 QH
Winter Quarter
 Embodies the material in CIV 3322 and CIV 3323.
Prereq. CIV 3311.

CIV 3322 Environmental Biological Processes 1 2 QH
Winter Quarter
 Discusses microbiology with emphasis on biological processes of importance in environmental engineering applications. Topics include cell structure, cell nutrition, morphology, microbial metabolism and kinetics as applied to biological treatment processes. *Prereq.* CIV 3310. May be taken concurrently with CIV 3311.

CIV 3323 Environmental Biological Processes 2 2 QH
Spring Quarter
 Continues CIV 3322. Topics include biological wastewater treatment processes, eutrophication theory, disinfection theory, and the effects of toxins on microorganisms. *Prereq.* CIV 3322.

CIV 3325 Environmental Chemistry Laboratory 2 QH
Winter Quarter
 Emphasizes analysis related to important topic areas in environmental chemistry. Topics include alkalinity, hardness, acid-base reactions, chemical kinetics, precipitation reactions, and chlorine and oxidation-reduction reactions. *Prereq.* CIV 3310. May be taken concurrently with CIV 3311.

CIV 3326 Biological Processes Laboratory 2 QH
Spring Quarter
 Focuses on analysis related to microbiological examination and other wastewater treatment parameters used to monitor the biological process such as: BOD, TOC, COD, gravimetric methods, and dissolved oxygen. *Prereq.* CIV 3325.

CIV 3327 Environmental Analysis 1 and 2 4 QH
Fall Quarter
 Embodies the material in CIV 3325 and CIV 3326.
Prereq. Taken concurrently with CIV 3312.

CIV 3331 Environmental Computer Applications 1 2 QH
Fall and Winter Quarters
 Employs computers to handle environmental engineering data. Topics include statistics, curve fitting correlation, linear regression, spreadsheet data handling, BOD kinetics, and chemical reaction interactions. *Prereq.* Admission to Graduate School of Engineering and familiarity with FORTRAN or BASIC.

CIV 3332 Environmental Computer Applications 2 2 QH
Spring Quarter
 Continues CIV 3331. Studies the application of computer modeling and data base management systems to specific environmental problems and processes including reactor kinetics, stream and lake modeling, treatment plant performance modeling, and stormwater management. *Prereq.* CIV 3331.

CIV 3341 Industrial Waste Disposal 2 QH
Spring Quarter
 Evaluates industrial waste problems and development of process design for the required treatment facilities, and studies various manufacturing processes and their wastewater problems. Examines industrial waste survey techniques, characteristics of industrial wastes, and evaluation of hazardous materials, waste reduction methods. Considers the physical, chemical, biological, and advanced treatment methods, as well as industrial wastewaters and disposal and treatment of industrial solids and liquids. *Prereq.* CIV 3311 and CIV 3317.

CIV 3343 Process Laboratory in Environmental Engineering 1 2 QH
Winter Quarter
 Laboratory scale unit operations illustrating the physical, chemical, and biological principles involved in water and wastewater treatment. The aim is to obtain criteria for system design. Topics include disinfection, water softening, sedimentation, chemical coagulation, and ion exchange. *Prereq.* CIV 3317 and CIV 3326.

CIV 3344 Process Laboratory in Environmental Engineering 2 2 QH
Spring Quarter
 Continues CIV 3343. Topics include biodegradability studies using activated sludge, fixed-film reactors, anaerobic digestion, vacuum filtration, and chemical-physical processes involved in wastewater treatment. A comprehensive evaluation of each unit process is required in a report from each student. *Prereq.* CIV 3343.

CIV 3348 Stream Sanitation 2 QH**Winter Quarter**

Analyzes the fate and effects of discharge of conservative and nonconservative pollutants in surface receiving waters and groundwaters. Topics include BOD and oxygen and relationships in streams, eutrophication and general water quality improvement techniques. *Prereq. CIV 3310.*

CIV 3352 Open Channel Flow 2 QH**Fall Quarter, Alternate Years**

Studies rapidly varied flow, hydraulic jump and its applications, and flow through nonprismatic channel sections. Topics include flow in channels of nonlinear alignment, wave action, unsteady flow, dynamic equations, wave propagation, and flood routing in rivers.

CIV 3355 Hydrology 1 2 QH**Winter Quarter, Alternate Years**

Discusses the elements of the hydrologic cycle, precipitation, evaporation, streamflow, and groundwater. Considers water balance equation for watersheds, streamflow hydrographs, unit hydrographs, and hydrographs of overland flow. Covers the relation between precipitation and runoff, hydrologic and hydraulic routings, and linear reservoirs routing. *Prereq. CIV 3131 and undergraduate fluid mechanics and hydraulic engineering.*

CIV 3356 Hydrology 2 2 QH**Spring Quarter, Alternate Years**

Investigates deterministic hydrologic models, probability in hydrology, and stochastic hydrology, generation of data, Markov chain series. Topics include flood forecasting, applications of hydrology, and design considerations. *Prereq. CIV 3132 and CIV 3355.*

CIV 3358 Flow Through Porous Media 2 QH**Fall Quarter, Alternate Years**

Examines groundwater uses, properties of porous media, infiltration, saturated and unsaturated zones, soil water interactions, and types of aquifers. Focuses on Darcy's law, Dupuit-Forchermier's assumption, groundwater flow equations, steady and unsteady cases, and steady state seepage problems, including method of flow nets. Discusses dispersion, quality, and contamination of groundwater. *Prereq. Undergraduate fluid mechanics and hydraulic engineering.*

CIV 3360 Groundwater and Seepage 2 QH**Winter Quarter, Alternate Years**

Studies hydraulics of wells, steady and transient flow equations, pumping tests, multiple well systems, and methods of images. Considers superposition, leaky aquifers, salt-water intrusion, static equilibrium and hydrodynamic equilibrium, and control of saline water intrusion. Topics include numerical and experimental methods, physical models, analog models, finite difference solution, and an introduction to the method of finite elements. *Prereq. CIV 3358.*

CIV 3367 Water Resources Planning 2 QH**Spring Quarter, Alternate Years**

Examines the nature of water resources projects (sociopolitical, legal), the objectives of water resources

planning (economic, cost, benefit), and problems in water resources engineering (development, design, operational, recapitulation). Introduces linear and dynamic programming, simulation methods, and includes case studies. *Prereq. CIV 3355.*

CIV 3370 Air Pollution Engineering 2 QH**Winter Quarter**

Investigates the theory and practice related to engineering management of air resources. Studies applications of models for the atmospheric dispersion of pollutants, and analyzes control systems for gaseous and particulate emissions utilizing dry collection, wet collection, absorption, and catalytic processes. Discusses source control evaluation and air quality standards. Course CIV 3374 is recommended. *Prereq. Admission to Graduate School of Engineering.*

CIV 3372 Air Sampling and Analysis 2 QH**Spring Quarter, Alternate Years**

Discusses the basic design considerations and requirements for air quality surveillance. Examines the methodologies for air quality sampling, sampling frequencies, measurement techniques and data acquisition, handling, and analysis. Discusses manual and automated techniques for evaluating source and ambient systems. Employs statistical techniques to evaluate air quality management strategies. *Prereq. CIV 3370.*

CIV 3374 Air Pollution Science 2 QH**Fall Quarter**

Explores the biological and chemical aspects of air pollution, emphasizing the toxicological aspects of the environment, physiological effects of aerosols, analysis of organic and inorganic constituents of the atmosphere and rationale for establishment of air quality criteria and standards. *Open to nonengineering as well as to engineering graduate students. Prereq. Permission of department and instructor.*

CIV 3376 Industrial Hygiene 2 QH**Winter Quarter**

Studies the characterization and control of industrial problems associated with noise, heat and ventilation. Discusses the physical and biological aspects of environmental stress. Emphasizes the application of engineering principles to the design of control systems. Reviews evaluation procedures for control effectiveness. *Prereq. Admission to Graduate School of Engineering.*

CIV 3378 Environmental Planning and Management 2 QH**Fall Quarter**

Examines the planning and operation, and management of specific environmental systems, such as collection systems. Topics include solid separators, combined systems control, sewer flushing, deposition loadings with least-squared applications, and case studies in optimal design of treatment plants with variable input. *Prereq. Admission to Graduate School of Engineering.*

CIV 3380 Environmental Protection 2 QH**Spring Quarter, Alternate Years**

Considers environmental quality and its effects on health, comfort, aesthetics, balance of ecosystems, and

renewable resources. Discusses the interaction of the water-land-air complex, vector control, food protection, ionizing radiation, other radiation, and the energies of heat and sound. *Prereq. Admission to Graduate School of Engineering.*

CIV 3384 Solid Waste Management 2 QH
Fall Quarter

Presents basic solid waste management for engineering and science students covering storage, collection practices, sanitary landfill principles, incineration practices, and reclamation possibilities. *Prereq. Admission to Graduate School of Engineering.*

CIV 3386 Hazardous Waste Practices 2 QH
Spring Quarter

Investigates hazardous waste management practices including: identification, storage, transport, treatment processes, incineration, recycling, reuse, chemical landfills, and groundwater contamination. *Prereq. CIV 3311 or 3312.*

CIV 3410 Soil Mechanics 1 2 QH
Fall Quarter

Studies phase relationships and index properties, permeability, capillarity, effective stress concept, porous media flow, stress distribution, stress path concept, and 1-D settlement analysis. *Prereq. Undergraduate course in soil mechanics.*

CIV 3411 Soil Mechanics 2 2 QH
Winter Quarter

Continues CIV 3410. Examines consolidation theory, 3-D settlement analysis, shear strength properties of soils, and stress path analysis. *Prereq. CIV 3410.*

CIV 3412 Stability and Seepage 2 QH
Spring Quarter

Continues CIV 3411. Reviews stability of open cuts and natural slopes, numerical analysis and computer applications to stability, seepage, consolidation, and deformation problems. Presents lab testing, field instrumentation, and special topics. *Prereq. CIV 3411 or CIV 3413.*

CIV 3413 Soil Mechanics 1, 2 4 QH
Fall Quarter

Embodies the material in CIV 3410 and CIV 3411. *Prereq. Undergraduate course in soil mechanics.*

CIV 3420 Foundation Engineering 1 2 QH
Fall Quarter, Alternate Years

Studies lateral earth pressure theory, retaining wall design, anchored bulkheads, braced cofferdams, dewatering, and observational approach to design. *Prereq. CIV 3411.*

CIV 3421 Foundation Engineering 2 2 QH
Winter Quarter, Alternate Years

Presents bearing capacity, design of shallow foundations, site improvement (preloading, deep densification), and case studies of foundation performance. *Prereq. CIV 3420.*

CIV 3422 Foundation Engineering 3 2 QH
Spring Quarter, Alternate Years

Surveys pile foundations, caissons, selection of foundation scheme, and case studies. *Prereq. CIV 3421.*

CIV 3423 Foundation Engineering 1 and 2 4 QH
Spring Quarter

Embodies the course content offered in CIV 3420 and CIV 3421. *Prereq. CIV 3411 or CIV 3413.*

CIV 3430 Soil-Structure Interaction 4 QH
Winter Quarter, Alternate Years

Introduces pile foundations, beam on elastic foundations, deformations of axially and laterally loaded single piles and pile groups using available computer software. Includes pile load tests and case histories. *Prereq. CIV 3411 or CIV 3413.*

CIV 3440 Experimental Soil Mechanics 4 QH
Spring Quarter, Alternate Years

Offers laboratory evaluation of engineering properties of soils with emphasis on permeability, compressibility and strength. Introduces model analysis of static and dynamic behavior of soils. *Prereq. CIV 3411 or CIV 3413.*

CIV 3450 Engineering Geology 2 QH
Winter Quarter

Presents selected topics in historical and structural geology related to engineering geology. Considers origin and occurrence of various rock types, geologic structures, and faulting and joint systems. Examines weathering of rock and weathering products, glaciation, geologic mapping, and environmental aspects. *Prereq. Undergraduate course in geology.*

CIV 3470 Introduction to Dynamics and 2 QH
Earthquake Engineering

Fall Quarter

Introduces dynamic response analysis of one-degree-of-freedom systems, characteristics of earthquakes and resulting ground motions, response spectra, and the stress-strain behavior of soils during dynamic and repeated loading. Includes lab and field determinations, wave propagation through elastic media, and the effect of local soil condition upon earthquake ground motions. *Prereq. Admission to the Geotechnical Engineering Program.*

CIV 3471 Advanced Soil Dynamics 2 QH
Winter Quarter, Alternate Years

Presents dynamics response analysis of a single mass, multidegree-of-freedom systems. Considers machine foundation design and analysis, soil-structure interaction, ground vibrations, sources, and control. Topics include shear strength during repeated loading, liquefaction; and dynamic analysis of retaining structures and slopes. *Prereq. CIV 3470.*

CIV 3480 Seismic Design 2 QH
Spring Quarter, Alternate Years

Surveys earthquake considerations in building design process, and dynamic analysis of multidegree-of-freedom elastic systems subjected to earthquake motions and cyclically applied forces. Discusses inelastic dy-

dynamic response analysis, seismic provisions of building codes, and soil-structure interaction. *Prereq. CIV 3470.*

CIV 3485 Earthquake Engineering 2 QH
Spring Quarter, Alternate Years

Examines seismic hazard and seismic risk analysis, seismic design decision analysis, lifeline earthquake engineering and pipelines, liquid storage tanks, and water distribution systems. Topics include earthquake analysis of earth dams and slopes, dynamic analysis of retaining walls and offshore facilities, and dynamically loaded piles. *Prereq. CIV 3470.*

CIV 3510 Advanced Structural Mechanics 1 2 QH
Fall Quarter

Analyzes force equilibrium (stress), deformation/deplacement (strain), and force/deformation (Hooke's Law) for an elastic solid. Studies compatibility, governing equations for complete and approximate elasticity solution, and plane stress solution for narrow rectangular beams. Considers torsion, Saint Venant's theory, membrane analogy, rectangular sections, and thin open and closed sections. Introduces bending of thin plates. *Prereq. Undergraduate structural mechanics and structural analysis.*

CIV 3511 Advanced Structural Mechanics 2 2 QH
Winter Quarter

Examines consistent models for the mechanics of simple structural elements: axial, bending, plane stress, and the like. Studies equilibrium, geometry of deformation, and force/deformation as the governing relations of all structural elements. Presents work and energy principles: virtual displacement, virtual forces, minimum potential energy, and minimum complementary energy. Introduces variational ideas and explores Rayleigh-Ritz method. *Prereq. CIV 3510.*

CIV 3520 Concrete Materials: Science and Technology 2 QH
Winter Quarter

Covers physical and micro-structural properties of hydrated cement. Discusses strength-porosity relationship, the concept of gel/space ratio, transition zone (cement paste-aggregate interface), mix design and procedures, admixtures, and pozzolans. Explores micro-cracking and the stress-strain curve, fracture and failure criteria, and dimensional stability. Topics include creep and shrinkage, durability and permeability, freezing and thawing, sulfate attack, alkali-aggregate reaction, corrosion of reinforcement, surface wear, deterioration control and prevention. Considers concretes for special applications: high-strength, shrinkage-compensating, fibre reinforced, and testing. *Prereq. Admission to Graduate School of Engineering.*

CIV 3521 Fracture and Fatigue 2 QH
Spring Quarter

Examines fracture and fatigue of materials and structures, emphasizing steel and concrete. Studies stress intensity factor, fracture toughness, mixed-mode fracture, linear-elastic versus nonlinear fracture-mechanics, fatigue-crack, initiation and propagation, stress corrosion cracking, corrosion fatigue, fracture criteria, and applications infinite element analysis. *Prereq. Admission to Graduate School of Engineering.*

CIV 3522 Nondestructive Evaluation 2 QH
Spring, Alternate Years

Explores nondestructive testing (NDT) of structures and materials emphasizing concrete and steel. Introduces theory, current technology, and practice including ultrasonic pulse velocity, pulse echo, acoustic emission, radioactive/nuclear, radiography, surface harness, penetration resistance, pullout, maturity, and others. Compares advantages and disadvantages of various methods as to accuracy/variability, safety, and cost effectiveness.

CIV 3525 Stability 2 QH
Spring Quarter

Discusses the prediction of the buckling loads in columns, behavior of beam columns, use of numerical methods to compute the buckling loads of nonprismatic members, and buckling of plates. *Prereq. CIV 3510 and CIV 3511.*

CIV 3530 Finite-Element Analysis of Structures 2 QH
Spring Quarter

Introduces finite-element method for structural analysis. Reviews the direct stiffness method, focusing on formulation of element stiffness matrices by direct use of elasticity relations and by energy methods for simple elements. Topics include axial, bending, plane stress, and plane strain; transformation of coordinate systems; lumping work equivalent loads; bounds on the error solution; plate bending; and use of finite-element computer programs. *Prereq. CIV 3511.*

CIV 3536 Advanced Structural Analysis 2 QH
Winter Quarter

Studies the formulation and solution of structural problems with primary application to member systems (trusses, frames, curved members), matrix formulation of flexibility and stiffness methods, and geometrically nonlinear behavior. *Prereq. Admission to the Graduate School of Engineering.*

CIV 3546 Advanced Structural Dynamics 2 QH
Winter Quarter, Alternate Years

Examines matrix formulation of the dynamic equations of equilibrium, generation of mass, stiffness and damping matrices, static condensation, modal analysis of linear response, and the response spectrum method in modal analysis. Discusses numerical integration techniques for nonlinear analysis of multidegree of freedom systems. *Prereq. CIV 3470.*

CIV 3559 Behavior of Reinforced Concrete Structures 2 QH
Fall Quarter

Covers moment-curvature relationships for reinforced concrete cross sections, and the effect of design parameters in resulting behavior, ductility, and effective stiffness.

CIV 3560 Prestressed Concrete 2 QH
Fall Quarter

Introduces the fundamentals of prestressing, including the design of prestressed concrete beams for flexure and shear and design of end blocks. Covers the load balancing method for the analysis of indeterminate

prestressed structures, and surveys column design. *Prereq.* Undergraduate reinforced concrete design and structural analysis.

CIV 3561 Reinforced Concrete Slabs 2 QH

Spring Quarter

Studies the design of two-way slabs by the equivalent frame method, yield line theory, and prestressing of slabs. Considers the strip method, and introduces folded plate design. *Prereq.* Undergraduate reinforced concrete design and structural analysis.

CIV 3570 Advanced Steel Design 2 QH

Fall Quarter

Offers advanced topics in elastic design in structural steel. Considers design problems involving braced and rigid frame structures subject to gravity, wind, and seismic loads. *Prereq.* Undergraduate steel design and structural analysis.

CIV 3571 Inelastic Steel Design 2 QH

Winter Quarter

Presents advanced topics in analysis and design in structural steel, emphasizing plastic behavior including rigid frame buildings and braced multistory frame buildings. *Prereq.* Undergraduate steel design and structural analysis.

CIV 3575 Bridge Design 2 QH

Winter Quarter, Alternate Years

Studies the behavior of different types of bridge decks, and the design of typical cases using the current AASHTO specifications. Examines the development of mathematical models for analyzing special cases. Topics include curved bridge design and skewed decks. *Prereq.* Graduate standing and undergraduate background in steel and concrete design.

CIV 3610 Urban Public Transportation 2 QH

Fall Quarter, Alternate Years

Considers the analysis and planning of public transportation systems, including bus, subway, commuter rail, and paratransit. Discusses performance prediction, service evaluation and efficiency control measure, demand prediction, and institutional and economic issues. *Prereq.* Admission to Graduate School of Engineering.

CIV 3630 Traffic Engineering 2 QH

Spring Quarter

Focuses on the measurement of traffic characteristics and system performance. Explores the theory of traffic flow and analytical techniques, systems hardware design and evaluation, current concerns of energy, environmental, and urban amenity impacts. Examines computer applications and institutional characteristics. *Prereq.* Admission to Graduate School of Engineering.

CIV 3635 Transportation Engineering 2 QH

Winter Quarter, Alternate Years

Describes and evaluates different modes of transportation, both existing and proposed, and their performance and cost characteristics. Discusses design, performance, and selection criteria for vehicles and roadbeds. *Prereq.* Admission to Graduate School of Engineering.

CIV 3640 Theory and Practice of Transportation 2 QH

Planning 1

Fall Quarter

Reviews the establishment of goals, objectives, and criteria. Addresses the current planning framework, and examines the performance characteristics of transportation systems, including public and private modes on land, water, and airways. *Prereq.* Admission to Graduate School of Engineering.

CIV 3641 Theory and Practice of Transportation 2 QH

Planning 2

Fall Quarter

Continues CIV 3640. Studies transportation demand modeling from regional economic analysis to traffic and public transportation network assignment. Discusses technical and economic evaluation, and examines current issues, including environmental assessment, transportation systems management, citizen participation, and planning in developing countries. *Prereq.* CIV 3640, taken previously or concurrently.

CIV 3650 Urban Transportation Analysis 1 2 QH

Winter Quarter, Alternate Years

Presents the principles of analysis of urban transportation systems, including travel demand equilibrium, and performance and evaluation techniques using aggregate and disaggregate methods. *Prereq.* CIV 3641 and appropriate graduate statistics courses.

CIV 3651 Urban Transportation Analysis 2 2 QH

Spring Quarter, Alternate Years

Continues CIV 3650. Emphasizes conceptualization, formulation, application, and evaluation of mathematical models utilized in urban transportation systems analysis. Presents case studies of representative analyses. Aims to help prepare students to conceptualize, formulate, apply and evaluate appropriate mathematical modeling techniques in transportation. *Prereq.* CIV 3650.

CIV 3798 Master's Continuation 0 QH

Any Quarter

CIV 3799 Doctoral Continuation 0 QH

Any Quarter

CIV 3830 Special Topic in Civil Engineering 2 QH

Fall, Winter, and Spring Quarters

Offers advanced topics selected and presented by a staff member. *This course is initiated by the appropriate discipline committee and approved by the department. Prereq.* Permission of instructor.

CIV 3835 Special Project in Civil Engineering 2 QH

Any Quarter

An individual effort in an area selected by student and adviser and approved by the departmental discipline committee resulting in a definitive report. *Prereq.* Permission of department.

CIV 3850 Master's Report 4 QH

Any Quarter

An individual effort consisting of laboratory and/or literature investigation and analysis or advanced design of a project in an area of civil engineering selected

by student and adviser resulting in a definitive report. *Prereq. Permission of department.*

CIV 3851 Master's Report 2 QH
Any Quarter

CIV 3860 Master's Thesis 8 QH
Any Quarter

Analytical and/or experimental research conducted by arrangement with and under the supervision of the department. *Prereq. Permission of department.*

CIV 3861 Master's Thesis 4 QH
Any Quarter

CIV 3862 Master's Thesis 2 QH
Any Quarter

CIV 3880 Doctoral Thesis 0 QH
Any Quarter

Open to full-time doctoral students only. Prereq. Admission to doctoral program in civil engineering.

Interdisciplinary Transportation

INT 3798 Master's Thesis Continuation 0 QH
Any Quarter

INT 3835 Special Project in Transportation 2 QH
Any Quarter

An individual effort in an area selected by student and adviser resulting in a definite report. *Prereq. Permission of department.*

INT 3850 Master's Report in Transportation 4 QH
Any Quarter

An individual effort consisting of laboratory and/or literature investigation and analysis or advanced de-

sign of a project in an area of transportation selected by student and adviser resulting in a definitive report. *Prereq. Permission of department.*

INT 3860 Master's Thesis in Transportation 8 QH
Any Quarter

Analytical and/or experimental work conducted by arrangement with and under the supervision of the department. *Prereq. Permission of department.*

Electrical and Computer Engineering

Each course description includes information on the quarter in which classes are usually offered. The quarters listed are presented for planning; however, the Graduate School of Engineering cannot guarantee that all courses will be offered. Students must refer to the Graduate School of Engineering Quarterly Course Offering sheets to determine what courses are actually offered in any given quarter.

ECE 3100 Introduction to Circuits and Systems 4 QH
Fall Quarter

Introduces the circuit elements (R, L, and C) and explores Kirchhoff's laws, Tellegen, Thevenin's theorem, Mesh and nodal analysis. Examines the development of system function approach, Laplace and Fourier transform theory applied to circuit analysis. Other topics include sinusoidal steady-state, n-port network theory, and power and energy concepts. *Prereq. Admission to graduate school.*

ECE 3101 Introduction to Electronics 4 QH
Winter Quarter

Discusses the characteristics of the theoretical physical junction, including the Ebers-Moll model for bipolar junction transistors, characteristics of bipolar and field-effect devices, basic digital inverters and logic gates, and various logic families. Studies the use of transistors in the design of analog circuits. Other topics include biasing, linearized incremental models, load lines, signal flowgraphs, frequency response and gain calculation for single and cascaded stages. *Prereq. ECE 3100 or equiv.*

ECE 3102 Introduction to Electromagnetic Field Theory 4 QH
Spring Quarter

Covers the definition of scalar and vector fields; vector calculus; concepts of gradient, divergence, curl and the "del" operator; and free-space electrostatics. Explores the generalization of the Maxwell equations to the case of time-varying fields; Faraday induction law, wave equations, and the plane wave solution. *Prereq. ECE 3100 or equiv.*

ECE 3103 Introduction to Digital Computers 4 QH
Fall Quarter

Introduces the basic components of digital systems and methods for their analysis and design, including combinational and sequential circuits, integrated circuit logic families and functional building blocks, registers, counters, decoders, multiplexers and memories. Examines data representation and coding techniques. Covers central processor alternatives: instruction formats, addressing modes, bus structures, arithmetic units, timing analysis, and stacks. Surveys algorithms for arithmetic operations with various data representations. *Prereq. Admission to graduate school.*

ECE 3104 Introduction to Communications 4 QH
Spring Quarter

Reviews system theory, convolution, Fourier series, Fourier integral, signal analysis, Fourier methods, correlation functions. Discusses density functions, power spectra, amplitude modulation, frequency modulation, phase modulation, sampling theory and digital modulation techniques. *Prereq. ECE 3108 or equiv.*

ECE 3105 Introduction to System Software 1 2 QH
Fall Quarter

Presents programming style considerations, software testing and software reliability. Demonstrates data structures, including stacks, queues, linked lists, trees and graphs. Emphasizes the use of PASCAL to implement typical system software routines that use the above data structures. Topics include modern system software considerations for multiprocessor, array processor and graphic processor systems. A knowledge of Pascal is helpful but not required for this course. *Prereq. Admission to graduate school.*

ECE 3106 Introduction to Systems Software 2 2 QH
Winter Quarter

Analyzes absolute and relocatable program translators. Topics include assemblers, disassemblers, macroassemblers, linkers, an overview of compilers, interpreters, simulators and emulators. Focuses on design and implementation of an absolute assembler for a very simplified instruction set. *Prereq. ECE 3105.*

ECE 3107 Introduction to System Software 3 2 QH
Spring Quarter

Analyzes operating system structure and concepts including memory management, fragmentation, paging, virtual memory, job and process scheduling, I/O management, and file management. Covers operating system concepts for multiuser systems: critical variables, race conditions, Dekker's algorithm, some sample multiuser routines. Investigates simulated paged memory management and process scheduling routines. *Prereq. ECE 3106.*

ECE 3108 Introduction to Signals and Systems 4 QH
Winter Quarter

Discusses continuous and discrete signals and systems, properties of systems, the input-output relationship of linear time-invariant systems. Other topics include discrete and continuous Fourier series and Fourier transforms, Laplace and z-transforms, and elements of filtering and sampling. *Prereq. ECE 3100 or equiv.*

ECE 3120 Power Circuit Analysis 1 2 QH
Fall Quarter

Introduces fundamental concepts of single-phase and polyphase power systems: definitions of terms, use of per unit quantities, equivalent circuits of symmetrical 3-phase systems, introduction of symmetrical components, short circuits on systems with a single power source. *Prereq. BSEE or ECE 3100 and ECE 3102.*

ECE 3130 Electrical Machinery Theory 1 2 QH
Fall Quarter

Reviews magnetic circuit concepts and electromechanical energy conversion principles. Discusses steady-state analysis of transformers, synchronous machines, and induction machines. *Prereq. BSEE or ECE 3100 and ECE 3102.*

ECE 3200 Mathematical Methods in 2 QH
Computer Science
Fall Quarter

Studies algebraic concepts relevant to computer science: sets, relations, mapping, orderings, algebraic systems, Boolean algebras, groups, rings, finite fields. Introduces vector spaces and linear algebras over finite fields. *Prereq. Admission to graduate school.*

ECE 3211 Mathematical Methods in Electrical 4 QH
Engineering 1
Fall and Winter Quarters

Surveys fundamental algebraic concepts: sets, functions, relations, operations. Presents algebraic structures: group, rings, fields, homomorphisms, polynomials. Studies vector spaces and linear operators: representations, matrices and linear algebraic equations, orthogonality, equivalence and similarity transformations, eigenvalues and eigenvectors, canonical forms, functions of a square matrix, quadratic forms and congruence transformations, orthogonal transformations. Introduces polynomial matrices and applications to communications and control theory. *Prereq. Admission to graduate school.*

ECE 3212 Mathematical Methods in Electrical 2 QH
Engineering 1-A
Fall and Winter Quarters

ECE 3212 and ECE 3213 cover the same material with the same prerequisites as ECE 3211, but in two 2 QH courses.

ECE 3213 Mathematical Methods in Electrical 2 QH
Engineering 1-B
Winter and Spring Quarters

Continues ECE 3212. *Prereq. ECE 3212.*

ECE 3221 Linear Systems Analysis 4 QH
Fall and Winter Quarters

Introduces the state variable theory of continuous and discrete linear systems. Topics include standard canonical representations, the concept of state and the representation of interconnected systems, linear spaces, the state equations and their solution, and stability. Introduces the general control problem in terms of controllability and observability. *Prereq. ECE 3211, ECE 3108 or equiv.*

ECE 3222 Linear Systems Analysis A 2 QH
Fall and Winter Quarters

ECE 3222 and ECE 3223 cover the same material with the same prerequisites as ECE 3221, but in two 2 QH courses.

ECE 3223 Linear Systems Analysis B 2 QH
Winter and Spring Quarters

Continues ECE 3222. *Prereq. ECE 3222.*

ECE 3231 Mathematical Methods in Electrical Engineering 2 4 QH
Summer Quarter

Covers complex variable theory and analytic functions and Cauchy-Riemann equations. Investigates complex integration and Cauchy integral formula, Taylor and Laurent Series, the residue theorem, conformal mapping. Other topics include Laplace transform and its applications, problems in partial differential equations, generalized Fourier series and Green's functions, general integral transforms, Sturm-Liouville, Fourier, Hankel, Legendre, and other integral transforms. *Prereq.* Admission to graduate school.

ECE 3232 Mathematical Methods in Electrical Engineering 2-A 2 QH
Summer Quarter

ECE 3232 and ECE 3233 cover the same material with the same prerequisites as ECE 3231, but in two 2 QH courses.

ECE 3233 Mathematical Methods in Electrical Engineering 2-B 2 QH
Summer Quarter
Continues ECE 3232. *Prereq.* ECE 3232.

ECE 3241 Applied Probability and Stochastic Processes 4 QH
Fall and Winter Quarters

Introduces probability, sample space and random variables, examples of discrete and continuous probability distribution functions, averages, moments and characteristic function, multivariate distributions, change of variables and functions of variables, central limit theorem, and description of stochastic vectors. Presents general concepts of stochastic processes: stationarity and ergodicity, stochastic continuity and differentiation, the Gaussian process, linear systems with stochastic inputs, correlation functions and power spectra, matched filtering, stochastic orthogonality and linear mean-square estimation filtering and prediction. *Prereq.* ECE 3108 or equiv.

ECE 3242 Applied Probability and Stochastic Processes A 2 QH
Fall and Winter Quarters

ECE 3242 and ECE 3243 cover the same material with the same prerequisites as ECE 3241, but in two 2 QH courses.

ECE 3243 Applied Probability and Stochastic Processes B 2 QH
Winter and Spring Quarters
Continues ECE 3242. *Prereq.* ECE 3242.

ECE 3302 Power Circuit Analysis 2 2 QH
Winter Quarter

Continues ECE 3120. Considers sequence impedances of various power-system elements from an application point of view. Demonstrates unsymmetrical faults on otherwise symmetrical 3-phase systems, open conductors and asymmetrical connections and loadings. Analyzes simultaneous faults on 3-phase systems. *Prereq.* ECE 3120.

ECE 3303 Power Circuit Analysis 3 2 QH
Spring Quarter

Continues ECE 3302. Introduces Clarke components and applications in analysis of asymmetrical systems and faults. Studies application of Clarke components to the solution of surge phenomena problems. Other topics include transmission line theory and fundamentals of systems stability. *Prereq.* ECE 3302.

ECE 3304 Solid State AC and DC Motor Control Systems 2 QH
Winter Quarter

Focuses on the application of solid-state devices to the control of AC and DC electrical machinery including rectifiers, inverters, choppers, and cyclo-converters, as applied to drive systems in industry and transportation. Emphasizes a case method approach. *Prereq.* BSEE or ECE 3100 and ECE 3101.

ECE 3305 Computers in Power Systems 1 2 QH
Fall Quarter

Introduces techniques used in solving power system problems with the digital computer. Examines matrix formulations. Traces a detailed treatment of the short-circuit problem, including balanced and unbalanced faults. Explores various iterative techniques for the solution of the power-flow problem. *Prereq.* ECE 3120.

ECE 3306 Computers in Power Systems 2 2 QH
Winter Quarter

Discusses practical considerations of solving large scale networks. Studies network reductions, distribution factors and contingency analysis techniques. Examines digital models for regulated generators, fixed and load tap changing transformers and HVDC transmission lines. Develops computer methods for economic dispatch, loss coefficients and application of pumped hydro. *Prereq.* ECE 3305.

ECE 3308 Electrical Machinery Theory 2 2 QH
Winter Quarter

Studies the mathematical description of a synchronous machine. Topics include per-unit representation, steady-state theory and transient performance, and flux distribution and saturation in synchronous machines. *Prereq.* ECE 3130.

ECE 3309 Electrical Machinery Theory 3 2 QH
Spring Quarter

Reviews transient behavior of synchronous machines, stability studies and excitation systems, synchronous machine modeling, generator protection, and trends in development of large generators. *Prereq.* ECE 3308.

ECE 3311 Software Engineering 1 4 QH
Fall Quarter

Introduces basic concepts in software engineering principles. Discusses techniques of structured software design and testing along with issues of program reliability and complexity. Surveys management techniques and explores a case study of a typical large software problem. *Prereq.* ECE 3105, ECE 3106, ECE 3107, or equiv., and a knowledge of a high-level programming language.

ECE 3312 Software Engineering 1-A 2 QH
 Fall and Winter Quarters
 ECE 3312 and ECE 3313 cover the same material with the same prerequisites as ECE 3311, but in two 2 QH courses.

ECE 3313 Software Engineering 1-B 2 QH
 Winter and Spring Quarters
 Continues ECE 3312. *Prereq.* ECE 3312.

ECE 3314 Software Engineering 2 2 QH
 Spring Quarter
 Focus turns away from the general issues of the first two courses in this sequence and toward a very specific issue: modular design of software. Issues of stepwise refinement and top-down design are explored in depth, and organizational/data-flow issues are considered. *Prereq.* ECE 3311 or ECE 3313.

ECE 3321 Digital Signal Processing 4 QH
 Winter Quarter
 Explores the theory and practice of modern signal processing techniques. Covers the characteristics of discrete signals and systems, sampling and A/D conversion, difference equations, and convolution. Considers the z-transform, the Fourier transform, the discrete Fourier transform, fast Fourier transform algorithms, and chirp z-transform algorithm. Other topics include digital filter realizations, design techniques for IIR and FIR digital filters, computer programs for filter design, and quantization effects in digital signal processing. *Prereq.* ECE 3221.

ECE 3322 Digital Signal Processing A 2 QH
 Fall and Winter Quarters
 ECE 3322 and ECE 3323 cover the same material with the same prerequisites as ECE 3321, but in two 2 QH courses.

ECE 3323 Digital Signal Processing B 2 QH
 Winter and Spring Quarters
 Continues ECE 3322. *Prereq.* ECE 3322.

ECE 3325 Numerical Methods and Computer Applications 1 4 QH
 Winter Quarter

Surveys numerical methods applied to engineering and scientific problems with emphasis on machine implementation and problem solving. Covers roundoff errors and cumulative errors, difference and summation calculus, roots of polynomials and nonlinear functions, orthogonal functions including polynomial, least squares, and Chebyshev approximation of functions. Covers interpolation, numeric quadrature, and numeric integration of ordinary differential equations. *Prereq.* Admission to graduate school and a working knowledge of FORTRAN.

ECE 3326 Numerical Methods and Computer Applications 1-A 2 QH
 Fall and Winter Quarters
 ECE 3326 and ECE 3327 cover the same material with the same prerequisites as ECE 3325, but in two QH courses.

ECE 3327 Numerical Methods and Computer Applications 1-B 2 QH
 Winter and Spring Quarters
 Continues ECE 3326. *Prereq.* ECE 3326.

ECE 3328 Numerical Methods and Computer Applications 2 4 QH
 Spring Quarter
 Analyzes spectral analysis, including fast Fourier transforms, Hilbert transforms, convolution, and correlation techniques. Demonstrates optimization, including dynamic programming and steepest descent techniques. Covers PERT and linear programming. *Prereq.* ECE 3325 or ECE 3327.

ECE 3331 Analog Integrated Circuits 4 QH
 Fall Quarter
 Emphasizes active transistor circuits and systems on modern integrated circuit architectures. Presents bipolar and field-effect (NMOS and CMOS) implementations of analog circuits. Explores characteristics and behaviors of analog IC structures through the study of circuits such as operational amplifiers, instrumentation amplifiers, voltage comparators, various types of filter configuration and integrators, and multipliers and logarithmic amplifiers. Covers linearity, dynamic range, slew-rate limiting, and speed and gain-bandwidth trade-offs. Traces the role of feedback in stabilizing, linearizing, and otherwise enhancing the performance of analog circuits. Explores noise limitations on circuit performance. Develops noise models of devices and circuits, leading to the prediction of system noise performance and techniques for optimizing signal-to-noise ratios. *Prereq.* ECE 3101 or equiv.

ECE 3332 Analog Integrated Circuits A 2 QH
 Fall Quarter
 ECE 3332 and ECE 3333 cover the same material with the same prerequisites as ECE 3331, but in two 2 QH courses.

ECE 3333 Analog Integrated Circuits B 2 QH
 Winter Quarter
 Continues ECE 3332. *Prereq.* ECE 3332.

ECE 3341 Electromagnetic Theory 1 4 QH
 Fall Quarter
 Emphasizes the fundamental equations, their physical meaning, principal mathematical techniques, and important engineering applications. Topics include sources of the EM field; Lorentz force equation; relations and point relations (differential equations and boundary conditions); electromagnetic energy and power; propagation of plane waves in homogeneous media; reflection and transmission; and scalar and vector potentials. Examines solutions in the absence of boundaries for static and dynamic problems, with or without symmetry. Also covers solutions to boundary value problems, Green's functions, transmission lines, resonators, and dielectric slabguide. *Prereq.* ECE 3102 or equiv.

| | |
|--|-------------|
| ECE 3342 Electromagnetic Theory A Fall Quarter | 2 QH |
| ECE 3342 and ECE 3343 cover the same material with the same prerequisites as ECE 3341, but in two 2 QH courses. | |
| ECE 3343 Electromagnetic Theory B Winter Quarter | 2 QH |
| Continues ECE 3342. <i>Prereq.</i> ECE 3342. | |
| ECE 3344 Electromagnetic Theory 2 Winter Quarter | 4 QH |
| Examines important electrodynamic applications using advanced mathematical techniques. Covers the general theory of wave guides and resonators with application to cylindrical geometry. Discusses dielectric rod wave guides, optical fibers, radiation, linear antennas, loop antennas, linear arrays, and ray optics. Studies scattering and diffraction of waves for planar, cylindrical, and spherical geometries, as well as effects of random media. <i>Prereq.</i> ECE 3341. | |
| ECE 3345 Electromagnetic Theory 2-A Winter Quarter | 2 QH |
| ECE 3345 and ECE 3346 cover the same material with the same prerequisites as ECE 3344, but in two 2 QH courses. | |
| ECE 3346 Electromagnetic Theory 2-B Spring Quarter | 2 QH |
| Continues ECE 3345. <i>Prereq.</i> ECE 3345. | |
| ECE 3347 Computational Methods in Electromagnetics Spring Quarter | 4 QH |
| Presents solutions to problems in electromagnetics, using a variety of numerical and computational methods. Uses finite element methods to solve problems in electrostatics, diffusion, and wave propagation, and moment methods to solve the integral equations related to currents and charges on wire structures. Treats direct and inverse scattering by approximate methods related to physical and geometrical optics. Introduces computational methods for the asymptotic evaluation of radiation integrals and basically non-numerical solutions to integral equations in electromagnetics. Also examines electromagnetic data handling, sampling, and processing. <i>Prereq.</i> ECE 3341 and ECE 3344. | |
| ECE 3348 Computational Methods in Electromagnetics A Fall Quarter | 2 QH |
| ECE 3348 and ECE 3349 cover the same material with the same prerequisites as ECE 3347, but in two 2 QH courses. | |
| ECE 3349 Computational Methods in Electromagnetics B Winter Quarter | 2 QH |
| Continues ECE 3348. <i>Prereq.</i> ECE 3348. | |
| ECE 3351 Digital Communications Winter Quarter | 4 QH |
| Focuses on the theoretical and practical aspects of digital communications in the presence of channel | |

distortion and additive noise. Topics include the basic binary and M-ary modulation techniques (PSK, PAM, FSK); orthogonal and biorthogonal signals, and their performance in an additive Gaussian noise channel; signal waveforms constructed from binary block and convolutional codes; hard-decision decoding and soft-decision decoding of coded signal waveforms, performance of coded waveforms in an additive white Gaussian noise channel; and trellis-coded modulation. *Prereq.* ECE 3241 and ECE 3104 or equiv.

| | |
|---|-------------|
| ECE 3352 Digital Communications A Fall Quarter | 2 QH |
| ECE 3352 and ECE 3353 cover the same material with the same prerequisites as ECE 3351, but in two 2 QH courses. | |
| ECE 3353 Digital Communications B Winter Quarter | 2 QH |
| Continues ECE 3352. <i>Prereq.</i> ECE 3352. | |
| ECE 3361 Detection and Estimation Theory Winter Quarter | 4 QH |
| Presents the classical theory of detection and estimation of signals in noise with emphasis on computer implementation of the theory including hypothesis testing criteria, coherent detection of M-ary signals, diversity receiver, and calculation of error probabilities. Other topics include detection in colored noise, parameter estimation using Bayes, maximum-likelihood, a maximum land posteriori criteria, and applications in pattern recognition and radar. <i>Prereq.</i> ECE 3241. | |
| ECE 3362 Detection and Estimation Theory A Winter Quarter | 2 QH |
| ECE 3362 and ECE 3363 cover the same material with the same prerequisites as ECE 3361, but in two 2 QH courses. | |
| ECE 3363 Detection and Estimation Theory B Spring Quarter | 2 QH |
| Continues ECE 3362. <i>Prereq.</i> ECE 3362. | |
| ECE 3371 Linear Optimal Control Theory Spring Quarter | 4 QH |
| Covers analysis and design of linear multivariable feedback control systems. Emphasizes state space techniques, and addresses linear optimal regulators and observers, optimal output feedback, tracking and disturbance rejection, robustness analysis, and loop shaping. <i>Prereq.</i> ECE 3221 and ECE 3241. | |
| ECE 3372 Linear Optimal Control Theory A Winter Quarter | 2 QH |
| ECE 3372 and ECE 3373 cover the same material with the same prerequisites as ECE 3371, but in two 2 QH courses. | |
| ECE 3373 Linear Optimal Control Theory B Spring Quarter | 2 QH |
| Continues ECE 3372. <i>Prereq.</i> ECE 3372. | |
| ECE 3381 Classical Control Theory Fall Quarter | 4 QH |
| Surveys basic systems modeling and steady state and transient response analysis. Introduces root-locus | |

plots, Bode plots, Nyquist plots, and Nichols chart, and discusses the design of first order cascade and feedback compensators using these plots. Other topics include pole-zero synthesis techniques and design techniques for the optimal linear regulator problem. *Prereq.* ECE 3108 or equiv.

ECE 3382 Classical Control Theory A **2 QH**
Fall Quarter

ECE 3382 and ECE 3383 cover the same material with the same prerequisites as ECE 3381, but in two 2 QH courses.

ECE 3383 Classical Control Theory B **2 QH**
Winter Quarter

Continues ECE 3382. *Prereq.* ECE 3382.

ECE 3384 Characteristics and Models of Solid-State Devices 1 **4 QH**
Winter Quarter

Investigates the physics of semiconductors and the operation of semiconductor devices. Topics include crystal structure, energy bands, carrier concentration at thermal equilibrium, semiconductor statistics, carrier transport phenomena, p-n junction theory, charge storage and diode transients, bipolar junction transistors, charge-control model, and the Gummel-Poon model. *Prereq.* ECE 3101 or equiv.

ECE 3385 Characteristics and Models of Solid-State Devices 1-A **2 QH**
Fall Quarter

ECE 3385 and ECE 3386 cover the same material with the same prerequisites as ECE 3384, but in two 2 QH courses.

ECE 3386 Characteristics and Models of Solid-State Devices 1-B **2 QH**
Winter Quarter

Continues ECE 3385. *Prereq.* ECE 3385.

ECE 3388 Characteristics and Models of Solid State Devices 2 **4 QH**

Analyzes metal-semiconductor contacts, methods of measurement of barrier height, MIS diode, C-V measurement to evaluate the interface-trapped charges. Discusses MOSFET device and structure, device scaling and second-order effects, CMOS structure, solid state microwave devices like MESFET, MODFET, and heterojunction bipolar transistor (HBT). Examines noise in the microwave devices. *Prereq.* ECE 3384.

ECE 3389 Characteristics and Models of Solid State Devices 2-A **2 QH**

ECE 3389 and ECE 3390 cover the same material with the same prerequisites as ECE 3388, but in two 2 QH courses. *Prereq.* ECE 3384.

ECE 3390 Characteristics and Models of Solid State Devices 2-B **2 QH**

Continues ECE 3389. *Prereq.* ECE 3389.

ECE 3391 Digital Computer Architecture **4 QH**

Deals with the design of new architectures as well as an understanding of those already extant. Considers both the hardware and system software that permit the

system to deal with multiple processes sharing common resources, such as the processor, a bus, primary memory, and disk storage. Topics include the operating system, caches and memory management, and I/O processing. Software topics include exercises in a small subset of VAX assembly language, typical HLL constructs and their translation to VAX assembly code, instructing and addressing mode frequencies, and consideration of the value of different data types. Introduces RISC and CISC architectures. Discusses issues concerning the subdivision of computational tasks and hard-wiring vs. microprogramming. Introduces details of a specific design to focus on solving such critical operations as pipeline design and efficient interrupt handling. *Prereq.* A good working knowledge of high-level language programming (Pascal or C, for example), a course in logic (gates, minimization, sequential and combinatorial circuits), and at least a rudimentary idea of assembly language programming and how a computer functions internally.

ECE 3392 Digital Computer Architecture A **2 QH**
Fall and Winter Quarters

ECE 3392 and ECE 3393 cover the same material with the same prerequisites as ECE 3391, but in two 2 QH courses.

ECE 3393 Digital Computer Architecture B **2 QH**
Winter and Spring Quarters

Continues ECE 3392. *Prereq.* ECE 3392.

ECE 3394 Microprogramming **2 QH**
Spring Quarter

Reviews topics in microprogramming and emulation including microprogramming concepts and techniques; microprogramming design approach using register transfer notation and precedence graphs; microprogrammed computers; bit-slice microprogramming; microprogramming a specific machine for emulation using a microprogramming language and its simulator; and current trends in microprogramming languages and support tools. *Prereq.* ECE 3391 or ECE 3393.

ECE 3395 VLSI Design **4 QH**
Spring Quarter

Covers MOS devices and circuits, electrical and logic design, logic arrays, fabrication, design rules, electrical parameters, delays, NMOS and CMOS subsystem design. Covers laboratory design project including layout design and verification. *Prereq.* ECE 3101 and ECE 3103 or equiv.

ECE 3396 VLSI Design A **2 QH**
Fall Quarter

ECE 3396 and ECE 3397 cover the same material with the same prerequisites as ECE 3395, but in two 2 QH courses.

ECE 3397 VLSI Design B **2 QH**
Winter Quarter

Continues ECE 3396. *Prereq.* ECE 3396.

ECE 3398 VLSI Architectures **4 QH**

Covers system clocking and system design issues, control path and data path design, systolic arrays, bit

serial architectures, and design for testability. Introduces silicon compilation. Includes lab project. *Prereq. ECE 3395.*

ECE 3399 VLSI Architectures A 2 QH

ECE 3399 and ECE 3400 cover the same material with the same prerequisites as ECE 3398, but in two 2 QH courses. *Prereq. ECE 3395.*

ECE 3400 VLSI Architectures B 2 QH

Continues ECE 3399. *Prereq. ECE 3399.*

ECE 3401 Digital Systems Design with Hardware Description Languages 4 QH
Spring Quarter

Covers design, simulation, modeling, and implementation of complex digital systems using high-level computer hardware description languages (HDL). Begins with a description of digital system design hierarchy and abstraction, followed by a brief overview of available design tools and simulation programs. Introduces HDs, with emphasis on VHDL and AHPL, and investigates using these languages for design and verification of digital systems at different levels of abstraction. Explores the use of VHDL software for design and simulation of large digital circuits. Also addresses silicon compilation, computer-aided design, and automatic generation of hardware. *Prereq. ECE 3391.*

ECE 3402 Digital Systems Design with Hardware Description Languages A 2 QH
Fall Quarter

ECE 3402 and ECE 3403 cover the same material with the same prerequisites as ECE 3401, but in two 2 QH courses. *Prereq. ECE 3391.*

ECE 3403 Digital Systems Design with Hardware Description Languages B 2 QH
Continues ECE 3402. *Prereq. ECE 3402.*

ECE 3412 Power System Planning 4 QH
Spring Quarter

Investigates engineering and economic considerations underlying the planning and development of modern interconnected power systems. Considers overall planning strategies involved in economic comparison of alternative development schemes. *Prereq. ECE 3120.*

ECE 3415 Power System Protection 2 QH
Winter Quarter

Considers protection applied to generation, transmission, and distribution. Investigates the characteristics and operating principles of various methods of protective relaying and analyzes current techniques pertaining to system protection. *Prereq. ECE 3303.*

ECE 3416 Power System Transients 2 QH
Fall Quarter

Examines transients in power systems due to system switching, lightning, or faults. Other topics include traveling-wave phenomena, insulation coordination, overvoltages due to disturbances on the system, and surge protection. *Prereq. ECE 3303.*

ECE 3423 Special Topics in Power 2 QH
Spring Quarter

Involves directed reading and discussion of topics of special interest in the power field. Presents series of lectures by guest speakers from industry on topics of particular interest to the power student. *Prereq. Permission of instructor.*

ECE 3424 Power System Dynamics 2 QH
Spring Quarter

Explores transient system models, small and large scale oscillations, solution of swing equation for single and multigenerator cases, load frequency and voltage controllers, and transient stability. *Prereq. ECE 3303.*

ECE 3430 Studies in Electric Power Transmission 2 2 QH
Fall Quarter

Covers elements in the design of AC overhead transmission lines: thermal limitation, series and shunt compensation, and environmental effects. Considers transposition, induced effects, and insulation level. Considers underground alternatives to overhead lines and elements of distribution. *Prereq. ECE 3303.*

ECE 3431 Studies in Electric Power Transmission 2 2 QH
Winter Quarter

Investigates fundamental concepts of high voltage DC power transmission, rectifier and inverter performance, regulation; protection, reactive power and filter requirements, practical arrangement of DC lines, and the impact of a DC line on overall power system operation. *Prereq. ECE 3303.*

ECE 3440 Microprocessor-Based Design 4 QH
Spring Quarter

Explores designing and programming a microcomputer system, including bus interface and timing, interrupts, various peripheral chips, and debugging with the HP64000 emulator. *Prereq. ECE 3103 or equiv.*

ECE 3441 Microprocessor-Based Design A 2 QH
Fall Quarter

ECE 3441 and ECE 3442 cover the same material with the same prerequisites as ECE 3440, but in two 2 QH courses.

ECE 3442 Microprocessor-Based Design B 2 QH
Winter Quarter

Continues ECE 3441. *Prereq. ECE 3441.*

ECE 3443 Theory of Computation 4 QH
Spring Quarter

Focuses on basic abstract models of computation. Topics include Turing machines, primitive recursive functions, recursive systems of equations, and abstract families of algorithms. Examines unsolvable problems and the Recursion Theorem. *Prereq. ECE 3200.*

ECE 3444 Theory of Computation A 2 QH
Fall Quarter

ECE 3444 and ECE 3445 cover the same material with the same prerequisites as ECE 3443, but in two 2 QH courses.

| | | | |
|--|-------------|--|-------------|
| ECE 3445 Theory of Computation B | 2 QH | ECE 3453 Combinatorial Methods and Optimization Techniques B | 2 QH |
| Winter Quarter | | Spring Quarter | |
| Continues ECE 3444. <i>Prereq. ECE 3444.</i> | | Continues ECE 3452. <i>Prereq. ECE 3452.</i> | |
| ECE 3447 Switching Theory 1 | 4 QH | ECE 3454 Graph Theory | 2 QH |
| Spring Quarter | | Spring Quarter | |
| Discusses logical design of combinational switching circuits, including minimization and decomposition of switching functions, multiple output networks, symmetric networks, threshold logic, and fault detection. Analyzes logic design of sequential switching circuits including finite-state machine model, iterative networks, capabilities and limitations of finite-state machines, state equivalence, synthesis of asynchronous sequential circuits, state assignment problem and partition theory, and machine decomposition. Explores logical design of sequential switching circuits, including the finite-state machine model, iterative networks, capabilities and limitations of finite-state machines, state equivalence, synthesis of asynchronous sequential circuits, state assignment problem and partition theory, and machine decomposition. <i>Prereq. ECE 3200.</i> | | Introduces fundamentals of graph theory, including blocks, trees, connectivity, partitions, traversability, line graphs, factorization, coverings, planarity, matrices, digraphs, and enumeration problems. Explores selected applications of graph theory in such fields as network theory, switching theory, and computer science. <i>Prereq. ECE 3211.</i> | |
| ECE 3448 Switching Theory 1-A | 2 QH | ECE 3460 Special Topics in Computer Engineering | 2 QH |
| Fall Quarter | | Spring Quarter | |
| ECE 3448 and ECE 3449 cover the same material with the same prerequisites as ECE 3447, but in two 2 QH courses. | | Investigates aspects of computer engineering not covered in other courses. The subject matter may change from year to year. | |
| ECE 3449 Switching Theory 1-B | 2 QH | ECE 3463 Robot Vision and Sensors | 4 QH |
| Winter Quarter | | Winter Quarter | |
| Continues ECE 3448. <i>Prereq. ECE 3448.</i> | | Investigates methods of acquiring, representing, and processing real-world information for robot control. Covers robot vision: low-level vision, real-time image understanding, and theory of motion. Introduces high-level vision by examining problems associated with part acquisition, representation, and reorientation. Covers internal robot sensors, which monitor the state of robot systems, and external robot sensors, which allow the system to interact with its environment. Examines force/torque, touch, proximity, and tactile sensors. <i>Prereq. ECE 3466.</i> | |
| ECE 3450 Switching Theory 2 | 2 QH | ECE 3464 Robot Vision and Sensors A | 2 QH |
| Spring Quarter | | ECE 3464 and ECE 3465 cover the same material with the same prerequisites as ECE 3463, but in two 2 QH courses. | |
| Surveys selected topics from the theory of finite automata, including such topics as machine experiments, information lossless machines, linear sequential machines, and finite-state recognizers. <i>Prereq. ECE 3447 or ECE 3449.</i> | | ECE 3465 Robot Vision and Sensors B | 2 QH |
| ECE 3451 Combinatorial Methods and Optimization Techniques | 4 QH | Continues ECE 3464. <i>Prereq. ECE 3464.</i> | |
| Winter Quarter | | ECE 3466 Robotics and Automation Systems | 4 QH |
| Introduces applied combinatorial mathematics and treats selected topics in enumerative analysis. Topics include permutations, combinations, generating functions, recurrence relations, and the principle of inclusion and exclusion. Discusses Polya's theory of counting and selected topics in optimization techniques, which include transport networks, matching theory, and linear programming, and introduces dynamic programming. <i>Prereq. ECE 3200.</i> | | Fall Quarter | |
| ECE 3452 Combinatorial Methods and Optimization Techniques A | 2 QH | Studies design and operation of general-purpose and industrial manipulator systems. Topics include robot mobility criteria, kinematic and dynamic models of mechanical arms, joint solution and motion characteristics, trajectory planning, arm control through coordinate transformations, classical feedback methods, modern closed-loop control techniques, and real-time control of robotic systems. <i>Prereq. ECE 3221.</i> | |
| Winter Quarter | | ECE 3467 Robotics and Automation Systems A | 2 QH |
| ECE 3452 and ECE 3453 cover the same material with the same prerequisites as ECE 3451, but in two 2 QH courses. | | Fall Quarter | |
| ECE 3453 Combinatorial Methods and Optimization Techniques B | 2 QH | ECE 3467 and ECE 3468 cover the same material with the same prerequisites as ECE 3466, but in two 2 QH courses. | |
| Spring Quarter | | ECE 3468 Robotics and Automation Systems B | 2 QH |
| Continues ECE 3452. <i>Prereq. ECE 3452.</i> | | Winter Quarter | |
| ECE 3454 Graph Theory | 2 QH | Continues ECE 3467. <i>Prereq. ECE 3467.</i> | |
| Spring Quarter | | | |

ECE 3469 Fault-Tolerant Computers 4 QH**Winter Quarter**

Examines concepts of computer systems structures and specifications, software and hardware interactions, failure and reliability, and errors and faults. Studies different types of faults: fault prevention and fault tolerance, redundancy management, reliability, and availability. Compares existing, fault-tolerant computer architectures such as SIFT, FTMP, Tandem 16, and Stratus/32. Techniques of error detection and error recovery. Mechanisms for damage confinement and damage assessment. Study of software fault tolerance techniques such as recovery block scheme, deadline mechanism, and N-version programming scheme. *Prereq. ECE 3391.*

ECE 3470 Fault-Tolerant Computers A 2 QH**Winter Quarter**

ECE 3470 and ECE 3471 cover the same material with the same prerequisites as ECE 3469, but in two 2 QH courses.

ECE 3471 Fault-Tolerant Computers B 2 QH**Spring Quarter**

Continues ECE 3470. *Prereq. ECE 3470.*

ECE 3472 Special Topics in Robotics 4 QH**Spring Quarter**

Focuses on dynamic analysis of manipulator motion, closed-form dynamic robot model construction, and real-time model optimization. Analyzes the influence of actuator models complexity on manipulator control. Also examines adaptive and non-adaptive control of manipulator robots with variable parameters, controllability and stability analysis, state space constraints and avoidance of obstacles, and adaptive identification of states, parameters, and variable payload. *Prereq. ECE 3466.*

ECE 3502 Special Topics in Digital Signal 2 QH**Processing-Fast Algorithms****Fall Quarter**

Surveys fast algorithms for implementation of digital filters and discrete Fourier transforms: FFT, convolution algorithm, Number Theoretic Transforms (NTT), filtering computation, and polynomial transforms. *Prereq. ECE 3321.*

ECE 3503 Two-Dimensional Digital Signal 2 QH**Processing****Winter Quarter**

This course is concerned with two-dimensional digital signal processing which is finding wide applications in many diversified areas. Covers 2-D shift invariant systems along with their stability, the 2-D Discrete Fourier Transform (DFT) and its FFT implementation, and 2-D digital filter design and implementation. *Prereq. ECE 3321.*

ECE 3505 Digital Image Processing 4 QH**Spring Quarter**

Discusses generation of digital image from the source, image digitizers and display devices, image transforms, enhancement techniques such as histogram, equalization, edge sharpening, etc. Other topics include

restoration by Wiener and Kalman filters, image coding using run length coding, DPCM, transform coding, and feature analysis. *Prereq. ECE 3321.*

ECE 3506 Digital Image Processing A 2 QH**Fall Quarter**

ECE 3506 and ECE 3507 cover the same material with the same prerequisites as ECE 3505, but in two 2 QH courses.

ECE 3507 Digital Image Processing B 2 QH**Winter Quarter**

Continues ECE 3506. *Prereq. ECE 3506.*

ECE 3508 Modern Special Analysis 4 QH

Introduces conventional methods of spectrum estimation: periodogram and autocorrelation methods with their smooth versions, the maximum likelihood method of Capon and its modifications, and the maximum entropy method with and without uncertainty in the correlation measurements. Demonstrates the Levinson algorithm, the minimum energy method, weighted Burg techniques, forward-backward least-squares, covariance least-squares, moving average (MA) and ARMA spectrum estimation, model order selection criteria, and harmonic decomposition methods: Prony, Pisarenko, and singular value decomposition methods. Introduces multichannel random processes, multichannel conventional spectrum estimation techniques, parametric modeling of multichannel time series, the Levinson-Wiggins-Robinson algorithm, and multichannel AR spectrum estimation techniques. *Prereq. ECE 3321.*

ECE 3509 Modern Spectral Analysis A 2 QH

ECE 3509 and 3510 cover the same material with the same prerequisites as ECE 3508, but in two 2 QH courses. *Prereq. ECE 3321.*

ECE 3510 Modern Spectral Analysis B 2 QH

Continues ECE 3509. *Prereq. ECE 3509.*

ECE 3511 Data Communications Networks 4 QH**Spring Quarter**

Traces elements of computer-communication networks; network topology and design, elements of protocols, routing and network control, and queuing and congestion control. Describes and compares several existing computer networks. *Prereq. ECE 3241.*

ECE 3512 Data Communications Networks A 2 QH**Winter Quarter**

ECE 3512 and ECE 3513 cover the same material with the same prerequisites as ECE 3511, but in two 2 QH courses.

ECE 3513 Data Communications Networks B 2 QH**Spring Quarter**

Continues ECE 3512. *Prereq. ECE 3512.*

ECE 3514 Error Correcting Codes 4 QH**Spring Quarter**

Covers error correcting codes and their decoding techniques which show promise for applications in digital communication, control, and computer systems. Emphasizes linear block codes based on algebraic struc-

tures; cyclic codes for random error correction (B-C-H codes) and burst error correction. Other topics include convolutional codes and decoding including the Viterbi algorithm, arithmetic codes, combination of codes, and coding for ranging and synchronization. *Prereq.* ECE 3211.

ECE 3515 Error Correcting Codes A 2 QH
Winter Quarter

ECE 3515 and ECE 3516 cover the same material with the same prerequisites as ECE 3514, but in two 2 QH courses.

ECE 3516 Error Correcting Codes B 2 QH
Spring Quarter
Continues ECE 3515. *Prereq.* ECE 3515.

ECE 3517 Information Theory A 2 QH
Winter Quarter
ECE 3517 and ECE 3518 cover the same material with the same prerequisites as ECE 3519, but in two 2 QH courses.

ECE 3518 Information Theory B 2 QH
Spring Quarter
Continues ECE 3517. *Prereq.* ECE 3517.

ECE 3519 Information Theory 4 QH
Fall Quarter
Offers an information theorist's viewpoint of communication systems. Covers concepts, definitions, and results concerning mutual information and entropy for discrete and continuous alphabets. Examines channel capacity and the converse to the coding theorem for discrete memoryless channels; Blahut/Arimoto algorithm for calculating channel capacity; random channel coding concepts; the random coding exponent; and the coding theorem for a noisy channel. Discusses critical rate, cutoff rate, and capacity for system design. Other topics include source coding of continuous and discrete sources, rate-distortion theory, and variable-length source coding via Huffman's algorithm. *Prereq.* ECE 3241 and ECE 3351.

ECE 3520 Special Topics in Communication Theory 2 QH
Spring Quarter
Explores current aspects of communication theory not covered in previous courses. Subject matter may change from year to year. *Prereq.* ECE 3241 and ECE 3351.

ECE 3521 Multidimensional Spectrum Estimation 2 QH
Introduces stationary random fields and their spectrum representation, plane waves and their frequency-wavenumber spectrum, conventional methods (FFT based) and m-D window functions, m-D maximum likelihood method of Capon. Presents 2-D maximum entropy methods, the extendability problem in spectrum estimation, and m-D parametric models for spectrum estimation: separable methods, m-D AR methods, techniques based on minimum variance representations, 2-D ARMA methods, and the m-D Prony and Pisarenko methods. *Prereq.* ECE 3503, and ECE 3508.

ECE 3522 Array Signal Processing 2 QH
Covers arrays systems: configurations, cost, complexity, narrowband and wideband systems. Explores problem formulation, duality between spectrum estimation and array processing, and array processing methods: beamforming, minimum variance distortionless, autoregressive, thermal noise, and music. Other topics include coherent versus incoherent sources, adaptive array processing, sidelobe cancellation, interference rejection, LMS algorithm, wideband array processing techniques, applications to sonar, radar, geophysics, and biomedicine. *Prereq.* ECE 3321.

ECE 3523 Communication Systems 4 QH
Fall Quarter
Focuses on radio communication systems as used in terrestrial and space communication applications. Investigates antenna gain, space loss, cosmic and atmospheric noise, and receiver noise as factors influencing the signal-to-noise ratio in space and satellite repeater systems. Discusses contemporary systems from the standpoint of signal spectrum, noise power and message ambiguity as exhibited at the output of the intermediate frequency receiver. Introduces the theoretical aspects of amplitude and angle modulation systems to cover multiplex systems, signal-to-noise ratio analysis of frequency multiplex systems, and time division multiplex systems. Covers digital systems including sampling, aliasing, and PCM/FM. Considers Bit stream organization for transmission. Discusses a PCM encoder as a means of matching the bit stream to the bandwidth. Examines contemporary communications systems used on balloons, rockets, and satellite repeaters. *Prereq.* ECE 3241 and ECE 3104 or equiv.

ECE 3524 Communication Systems A 2 QH
Fall Quarter
ECE 3524 and ECE 3525 cover the same material with the same prerequisites as ECE 3523, but in two 2 QH courses.

ECE 3525 Communication Systems B 2 QH
Winter Quarter
Continues ECE 3524. *Prereq.* ECE 3524.

ECE 3527 Nonlinear Systems 1 2 QH
Fall Quarter, As Announced
Investigates operators and functionals, functional power series representation of nonlinear systems, functional representation of the response of a nonlinear system when its input is either a constant, a sinusoid, or a transient. Discusses system transforms and applications to the analysis and synthesis of nonlinear systems in terms of functional power series. *Prereq.* ECE 3241 and ECE 3221.

ECE 3528 Nonlinear Systems 2 2 QH
Winter Quarter, As Announced
Studies nonlinear systems with random inputs, functional representation of the response of a nonlinear system when its input is a random process, orthogonal systems of functionals, and representation and analysis of nonlinear systems in terms of orthogonal systems of functionals. Other topics include the optimum nonlinear filter, predictor, and general operator; spe-

cial classes of nonlinear systems; and determination of optimum nonlinear systems for generalized error criteria. *Prereq.* ECE 3527.

ECE 3529 Nonlinear Systems 3 2 QH
Spring Quarter, As Announced

Studies functional analysis of systems characterized by nonlinear differential equations. Examines operator approach to system theory and its relationship to differential equation representations and the methods of iteration in nonlinear theory and its application to feedback systems. *Prereq.* ECE 3528.

ECE 3530 Three-Dimensional Picture Processing 2 QH
Spring Quarter

Focuses on the application of computer, optical, and analytic methods in abstracting geometrical information from pictures. Examines the pictorial presentation of data trains into multidimensional pictures and reconstructing of three-dimensional objects from two-dimensional pictures. Discusses applications of X-ray analysis, radar target identification, microscopy, and sensory perception. Students will have the chance to pursue individual projects during the term. *Prereq.* ECE 3321.

ECE 3531 Adaptive Signal Processing 4 QH

Introduces optimum filtering (Wiener-Kalman), signal and system modeling using linear prediction, adaptive filtering (FIR, IIR), fast algorithms for least squares adaptive filters, adaptive array processing, and VLSI architectures for adaptive signal processing. *Prereq.* ECE 3321.

ECE 3532 Adaptive Signal Processing A 2 QH

ECE 3532 and ECE 3533 cover the same material with the same prerequisites as ECE 3531, but in two 2 QH courses. *Prereq.* ECE 3321.

ECE 3533 Adaptive Signal Processing B 2 QH
 Continues ECE 3532. *Prereq.* ECE 3532.

ECE 3534 Digital Signal Processing of Speech 4 QH
Signals

Emphasizes the analysis and recognition of speech using computer techniques. Introduces speech physiology, linguistics, phonetics, and acoustics. Examines models of speech production. Other topics include short-term processing of speech (temporal features, Fourier analysis, applications), theory of linear predictive coding and applications, homomorphic analysis of speech and applications, and speech and speaker recognition. *Prereq.* ECE 3221.

ECE 3535 Digital Processing of Speech Signals A 2 QH

ECE 3535 and ECE 3536 cover the same material with the same prerequisites as ECE 3534, but in two 2 QH courses. *Prereq.* ECE 3321.

ECE 3536 Digital Processing of Speech Signals B 2 QH
 Continues ECE 3535. *Prereq.* ECE 3535.

ECE 3537 Multi-User Communication Systems 4 QH

Discusses contention-free multiple-access techniques: frequency-division multiple-access (FDMA) and time-division multiple-access (TDMA). Explores spread-spectrum multiple-access (SSMA) communications:

Direct-sequence SSMA, frequency-hop SSMA, and hybrid SSMA systems. Analyzes communication networks: queuing theory, multiple-access with contention (ALOHA random-access and tree algorithms for random-access), and network routing and flow control (quasi-static control versus dynamic control). Surveys applications of multi-user communication systems: computer-communication networks, broadcast satellite systems, military communications, mobile radio communications, packet-radio communication networks, and fiber-optic local-area networks. *Prereq.* ECE 3351.

ECE 3538 Multi-User Communication Systems A 2 QH

ECE 3538 and ECE 3539 cover the same material with the same prerequisites as ECE 3537, but in two 2 QH courses. *Prereq.* ECE 3351.

ECE 3539 Multi-User Communication Systems B 2 QH

Continues ECE 3538. *Prereq.* ECE 3538.

ECE 3540 Digital Control Systems 4 QH
Spring Quarter

Analyzes linear discrete-time dynamic systems, discretization of continuous systems, sampling and aliasing. Considers design of digital control systems using transform techniques by discrete equivalent and direct design methods: root locus, Bode and Nyquist diagrams and Nichols charts. Other topics include multivariant digital control using state-space methods: pole placement, observer, and regulator design; controller implementation issues: digital filter realizations, nonlinear effects due to quantization, roundoff, deadband, and limit cycles; selection of the sampling rate. *Prereq.* ECE 3221 and ECE 3381.

ECE 3541 Digital Control Systems A 2 QH
Fall Quarter

ECE 3541 and ECE 3542 cover the same material with the same prerequisites as ECE 3540, but in two 2 QH courses.

ECE 3542 Digital Control Systems B 2 QH
Winter Quarter

Continues ECE 3541. *Prereq.* ECE 3541.

ECE 3543 Stochastic Control Systems 4 QH
Fall Quarter

Presents techniques and results of modern stochastic system theory: basics of continuous-time stochastic processes; Markov processes; diffusion processes and drift; solution concepts, Ito integrals, and the Ito formula; fundamentals of martingales; stochastic stability; state estimation and nonlinear filtering; stochastic control; linear stochastic systems: the Kalman filter and LQG control; and application areas. *Prereq.* ECE 3241.

ECE 3544 Stochastic Control Theory A 2 QH
Fall Quarter

ECE 3544 and ECE 3545 cover the same material with the same prerequisites as ECE 3543, but in two 2 QH courses.

ECE 3545 Stochastic Control Theory B 2 QH
Winter Quarter

Continues ECE 3544. *Prereq.* ECE 3544.

ECE 3546 Advanced Topics in Stochastic and Nonlinear Systems 4 QH
 Focuses on current research topics in stochastic systems and nonlinear dynamics. May cover large deviations and stochastic optimization, stochastic stability, global dynamics, bifurcations and singular perturbations, and nonlinear circuits. *Prereq. ECE 3543.*

ECE 3547 Advanced Topics in Stochastic and Nonlinear Systems A 2 QH
 Winter Quarter
 ECE 3547 and ECE 3548 cover the same material with the same prerequisites as ECE 3546, but in two 2 QH courses.

ECE 3548 Advanced Topics in Stochastic and Nonlinear Systems B 2 QH
 Spring Quarter
 Continues ECE 3547. *Prereq. ECE 3547.*

ECE 3549 Multivariable Control Systems 4 QH
 Spring Quarter
 Covers mathematical preliminaries, polynomials, and polynomial matrices; representations of linear multivariable system; matrix fraction description (MFD) and polynomial matrix description (PMD); responses of linear multivariable systems; controllability, observability, and canonical forms; and poles and zeros of multivariable systems. Examines also stability, realization problems, interaction control, state feedback and observer design, compensator design, stability and robustness, noninteraction control, and frequency domain design techniques. *Prereq. ECE 3221 and ECE 3381.*

ECE 3550 Multivariable Control Systems A 2 QH
 Fall Quarter
 ECE 3647 and ECE 3648 cover the same material with the same prerequisites as ECE 3646, but in two 2 QH courses. *Prereq. ECE 3321 and ECE 3381.*

ECE 3551 Multivariable Control Systems B 2 QH
 Continues ECE 3550. *Prereq. ECE 3647.*

ECE 3560 Acoustics 1 2 QH
 Fall Quarter
 Introduces the wave theory of sound including radiation, reflection, and transmission phenomena, distributed system analogies, and sound measurements. *Prereq. ECE 3341.*

ECE 3561 Acoustics 2 2 QH
 Winter Quarter
 Investigates speech and hearing, microphones and loudspeakers, guided waves, room acoustics, and environmental acoustics. *Prereq. ECE 3560.*

ECE 3562 Acoustics 3 2 QH
 Spring Quarter
 Focuses on scattering and diffraction, effects of viscosity and heat conduction, and finite amplitude and shock waves. Introduces underwater sound. *Prereq. ECE 3561.*

ECE 3563 Radar Systems 1 4 QH
 Winter Quarter
 Emphasizes systems aspects of radar engineering. Topics include basic theory of radar detection; measurement of range, angle, and Doppler shift; classes of radar systems; types of radar noise; components of a radar system; matched filters and correlation receivers as applied to radar systems; and fundamental ideas of radar system analysis. Also studies search radar theory; maximum likelihood estimation approach to measurement of radar target parameters; resolution and ambiguity functions applied to radar; and radar parameter uncertainty principles. *Prereq. ECE 3241.*

ECE 3564 Radar Systems 1-A 2 QH
 Fall Quarter
 ECE 3564 and ECE 3565 cover the same material with the same prerequisites as ECE 3563, but in two 2 QH courses. *Prereq. ECE 3241.*

ECE 3565 Radar Systems 1-B 2 QH
 Winter Quarter
 Continues ECE 3564. *Prereq. ECE 3564.*

ECE 3566 Radar Systems 2 2 QH
 Spring Quarter
 Presents advanced topics in radar systems engineering. Topics include design considerations for multistatic radar systems and synthetic aperture radars; tracking systems; radar wave form synthesis; multifunction array radar techniques; and selected topics in radar sensing techniques and devices. *Prereq. ECE 3563 or ECE 3565.*

ECE 3571 Fourier Optics 4 QH
 Fall Quarter
 Covers optical diffraction and imaging problems as linear systems; necessary tools of Fourier analysis and linear systems analysis for solving the scalar wave equation; waves and their properties; and reflection, refraction, polarization, and propagation of waves. Also examines foundations of scalar diffraction theory—including Fresnel and Fraunhofer diffraction, interferometry, division of amplitude, division of wavefront, interferometric instrumentation, Fourier transforming, image properties of lenses, and coherent and incoherent imaging; and advanced topics in the application of communication theory to optical problems, transfer and spread functions, spatial filtering, and holography. *Prereq. ECE 3581.*

ECE 3572 Fourier Optics 1-A 2 QH
 Winter Quarter
 ECE 3572 and ECE 3573 cover the same material with the same prerequisites as ECE 3571, but in two 2 QH courses. *Prereq. ECE 3581 or ECE 3582.*

ECE 3573 Fourier Optics 1-B 2 QH
 Spring Quarter
 Continues ECE 3572. *Prereq. ECE 3572.*

ECE 3574 Fourier Optics 2 2 QH
 Fall Quarter
 Covers current topics of interest in Fourier optics and optical instrumentation. Examines application of coherence phenomena to optical instrumentation such as

microdensitometers, microscopes, viewers, cameras, spectrophotometric and interferometric instruments. Other topics include applications of holography, optical data processing and computing, holographic memories, optical modulation, noise and its effects on data collection, synthetic aperture optics, and medical application of laser optics. *Prereq.* ECE 3573 or ECE 3571.

ECE 3576 Lasers 1 2 QH
Fall Quarter

Reviews basic optical principles and atomic physics. Introduces optical coherence, models for the interaction of electromagnetic radiation with matter, and lasers. *Prereq.* ECE 3341.

ECE 3577 Lasers 2 2 QH
Winter Quarter

Investigates laser threshold and rate equations, elementary resonator theory and fabrication, giant pulse operation, specific solid-state, liquid, and gas lasers, and laser systems. *Prereq.* ECE 3576.

ECE 3578 Lasers 3 2 QH
Spring Quarter

Surveys applications of lasers and laser systems for a variety of engineering and basic science disciplines. Examines specific laser optoelectronic devices. *Prereq.* ECE 3577.

ECE 3579 Optoelectronics and Fiber Optics 2 QH

Analyzes elements and characteristics in optical communication systems including elements which generate, transfer, and detect optical signals. Topics include resonance and guiding phenomena, semiconductor physics, LED's, lasers, diode detectors, optical waveguide theory and design, and optical communication systems criteria. *Prereq.* ECE 3580.

ECE 3580 Electro-Optics 1 2 QH
Spring Quarter

Surveys the basic concepts necessary for understanding and evaluating the optics involved in electro-optical systems. Focuses on the optical system as a linear system, matrix methods, diffraction and interference, and imaging and aberrations. *Prereq.* BS degree in engineering or physics.

ECE 3581 Electro-Optics 2 2 QH
Fall Quarter

Surveys the basic concepts necessary for understanding electro-optical devices. Topics include wave propagation in isotropic and nonisotropic media, optics of crystals, polarization, optical resonators, guided waves, modulators and detectors, and thin-film optics. *Prereq.* ECE 3580.

ECE 3582 Electro-Optics 4 QH
Spring Quarter

Covers the same material as in ECE 3580 and ECE 3581. *Prereq.* BS in Engineering or physics.

ECE 3583 Optical Properties of Matter 1 2 QH
Fall Quarter

Introduces the optics of crystals: classification and effects of crystal symmetry on optical properties, classical description of wave propagation in crystals, appli-

cations of the theory to modulation, pulse generation, and nonlinear optics. *Prereq.* BS degree in engineering or physics.

ECE 3584 Optical Properties of Matter 2 2 QH
Winter Quarter

Introduces electro-optical and magneto-optical effects in material media: linear and nonlinear optical materials, elasto-optic and acousto-optical materials, polarization and propagation effects, and modulation. *Prereq.* ECE 3583.

ECE 3585 Optical Properties of Matter 3 2 QH
Spring Quarter

Covers thin films and optical fibers, multilayer filters, dichroics, and integrated optics. *Prereq.* ECE 3584.

ECE 3586 Principles of Optical Detection 4 QH
Spring Quarter

Emphasizes the detector as a component of an optical system. Topics include the laws governing radiation and radiometry; properties of real radiation sources; detailed descriptions of detection devices, noise, contrast, and MTF; imaging and ranging devices; and electro-optical detector systems analysis. Also includes practical consideration of real detectors, resolution and recognition of signals, heterodyne detection, sub-nano second pulse detection, and calibration of electro-optical detectors. *Prereq.* BS degree in engineering or physics.

ECE 3587 Principles of Optical Detection A 2 QH
Winter Quarter

ECE 3587 and ECE 3588 cover the same material with the same prerequisites as ECE 3586, but in two 2 QH courses. *Prereq.* BS degree in engineering or physics.

ECE 3588 Principles of Optical Detection B 2 QH
Spring Quarter

Continues ECE 3587. *Prereq.* ECE 3587.

ECE 3589 Optical Storage and Display 2 QH
Spring Quarter

Surveys materials and methods for the storage and display of information. Topics include photographic film, holograms, storage tubes, magneto-optical films, photochromic materials, electro-optical crystals, evaporated thin films, and liquid crystals. *Prereq.* BS degree in engineering or physics.

ECE 3590 Optical Instrumentation Design 2 QH
Fall Quarter

Introduces the design of optical instrumentation and principles and basic concepts of optical systems. Topics include mechanical shock and vibration, kinematic designs, application of third-order aberrations, simple optical ray tracing, optical testing, tolerances, optical instrumentation, philosophy, functional design, design for quantity production, quality assurance, "special order" design, and industrial design. *Prereq.* BS degree in engineering or physics.

ECE 3591 Spectroscopic Instrumentation 2 QH
Winter Quarter

Surveys optical instrumentation employed in analysis and control situations. Examines modern methods of

spectrometry and interferometry, optimization of analytical systems, topics in electron spectroscopy, X-ray spectroscopy, microwave spectroscopy, and related fields. *Prereq.* ECE 3581.

ECE 3592 Remote Sensing 2 QH
Spring Quarter, As Announced

Focuses on electromagnetic fundamentals related to passive and active remote sensing of the earth. Covers geophysical exploration techniques, radar fundamentals and radar scattering, and instrumentation and data processing. *Prereq.* ECE 3341.

ECE 3593 Plasma Engineering 4 QH
Fall Quarter, As Announced

Reviews the basic principles and applications of plasma and gaseous discharges. Topics include gas kinetics, interaction of electrons and ions with static and rf fields, and wave propagation in plasmas. Discusses applications in material processing, space exploration and microwave devices. *Prereq.* ECE 3341.

ECE 3594 Plasma Theory 4 QH
Winter Quarter, As Announced

Introduces the basic theory of gaseous discharges. Examines fluid and kinetic description of collisionless and collisional plasmas with and without magnetic field effects. Emphasizes linear stability analysis although nonlinear effects will also be discussed. *Prereq.* ECE 3341.

ECE 3595 Plasma Theory A 2 QH
Winter Quarter, As Announced

ECE 3595 and ECE 3596 cover the same material with the same prerequisites as ECE 3594, but in two 2 QH courses.

ECE 3596 Plasma Theory B 2 QH
Spring Quarter, As Announced

Continues ECE 3595. *Prereq.* ECE 3595.

ECE 3597 Optical Properties of Matter 4 QH
Fall Quarter

Embodies the material in ECE 3583 and ECE 3584.

ECE 3600 Microwave Properties of Materials 4 QH

Covers general dielectric and magnetic properties of materials, tensor properties of dielectric and magnetic materials, special microwave properties of thin film materials, and experimental techniques developed in the characterization of microwave materials. *Prereq.* ECE 3102 and ME 1386 or equiv.

ECE 3601 Microwave Properties of Materials A 2 QH

ECE 3601 and ECE 3602 cover the same material with the same prerequisites as ECE 3600, but in two 2 QH courses. *Prereq.* ECE 3102, ME 1326, or equiv.

ECE 3602 Microwave Properties of Materials B 2 QH
Continues ECE 3601.

ECE 3603 Propagation in Artificial Structures 4 QH

Covers effective dielectric and permeability constants in composite materials at high frequencies, electromagnetic wave propagation in electrical and magnetic anisotropic media, magnetostatic and magneto-elastic wave propagation in single layer, and electromagnetic

wave propagation in multi-layers. *Prereq.* ECE 3102 or equiv.

ECE 3604 Propagation in Artificial Structures A 2 QH
ECE 3604 and ECE 3605 cover the same material with the same prerequisites as ECE 3603, but in two 2 QH courses.

ECE 3605 Propagation in Artificial Structures B 2 QH
Continues ECE 3604. *Prereq.* ECE 3604.

ECE 3606 Applications of Plasma Engineering 4 QH

Covers basic operational principles of microwave electron devices, the theory of electric domain formation, free electron and gaseous lasers, particle beam accelerators, and radiation sources. Topics include both classical microwave devices such as magnetrons, gyrotrons and crossed-field amplifiers, and solid-state devices such as Gunn diodes and Impatt diodes. *Prereq.* ECE 3593.

ECE 3607 Applications of Plasma Engineering A 2 QH

ECE 3607 and ECE 3608 cover the same material with the same prerequisites as ECE 3606, but in two 2 QH courses. *Prereq.* ECE 3593.

ECE 3608 Applications of Plasma Engineering B 2 QH
Continues ECE 3607. *Prereq.* ECE 3607.

ECE 3609 Special Topics in Electromagnetics 4 QH
As Announced

Concentrates on inverse problems associated with multidimensional wave equations such as the Schrodinger equation, Maxwell equations, and the elastic-wave equation. Develops the theories using both the operator formalism employed in electromagnetic and acoustic scattering theory. Topics include the inverse Sturm Liouville problem, the deterministic and random inverse source problems, inverse diffraction, and the multidimensional inverse scattering problem. Accompanies the theoretical development with a thorough review of current applications of inverse scattering theory, including structure determination using X-rays and electron probes, S-ray holography, geophysical prospecting and remote sensing, coherent radar imaging, and diffraction tomography. *Prereq.* ECE 3231 and permission of instructor.

ECE 3610 Electronics of Analog Signal Processing 4 QH
Spring Quarter, As Announced

Studies analog signal acquisition and processing utilizing state of the art devices and circuit techniques such as adaptive filters in sampled data systems, CZTs for spectral analysis, correlated double sampling for improved S/N ratios, and solid-state imaging systems. Covers linear and nonlinear processing with MOS, bipolar, and CTDs such as CCDs and SAWs. Demonstrates analog versus digital approaches for implementation of similar applications, such as bandwidth requirements, throughput, accuracy, cost, etc. *Prereq.* ECE 3331 and ECE 3384.

ECE 3611 Electronics of Analog Signal Processing A 2 QH
Fall Quarter, As Announced

ECE 3611 and ECE 3612 cover the same material with the same prerequisites as ECE 3610, but in two 2 QH courses.

ECE 3612 Electronics of Analog Signal Processing B 2 QH
Winter Quarter, As Announced
Continues ECE 3611. *Prereq. ECE 3611.*

ECE 3613 Microwave Semiconductor Devices and Circuits 4 QH
Spring Quarter, As Announced

Explores S parameter theory, wave guide junctions, and microstriplines and coplanar waveguides. Studies operation principles of transferred electron devices and avalanche transit time devices such as Gunn diodes, IMPATTs, and TRAPATTs. Also examines parametric devices; microwave transistors such as bipolar transistors and field effect transistors; microwave circuit characterization; and design of amplifiers and oscillators. *Prereq. ECE 3341 and ECE 3344.*

ECE 3614 Microwave Semiconductor Devices and Circuits A 2 QH
Fall Quarter

ECE 3614 and ECE 3615 cover the same material with the same prerequisites as ECE 3613, but in two 2 QH courses.

ECE 3615 Microwave Semiconductor Devices and Circuits B 2 QH
Continues ECE 3614. *Prereq. ECE 3614.*

ECE 3616 Active Network Synthesis and Design 4 QH
Develops multiloop feedback techniques as applied to integrated circuit designs such as three-stage op-amp realizations and minimum sensitivity amplifiers. Analyzes application of these circuits in continuous-time and switched capacitor filters. Develops single-active biquadratic filter sections of Sallen and Key and Friend-Delyannis. Discusses multiloop and multiple-active element realizations such as the generalized impedance converter (GIC), frequency-dependent negative resistance (FDNR), follow-the-leader (FTL) and leap-frog (LF) structures considers sensitivity, yield factors, gain-bandwidth product, and the approximation problem. Develops MOS switched-capacitor realizations of basic filter structures. *Prereq. ECE 3331.*

ECE 3617 Active Network Synthesis and Design A 2 QH
Fall Quarter
ECE 3617 and ECE 3618 cover the same material with the same prerequisites as ECE 3616, but in two 2 QH courses.

ECE 3618 Active Network Synthesis and Design B 2 QH
Winter Quarter
Continues ECE 3617. *Prereq. ECE 3617.*

ECE 3619 Network Synthesis 4 QH
Fall Quarter

Explores matrix circuit analysis including m-port parameter systems, positive-real functions, and energy functions. Examines driving-point synthesis techniques for LC, RC, and RL networks and driving-point synthesis of RLC networks. Other topics include properties of two-port networks, two-port synthesis, including the parallel ladder realization, and lattice synthesis. *Prereq. BSEE or ECE 3100 and ECE 3101.*

ECE 3620 Network Synthesis A 2 QH
Winter Quarter

ECE 3620 and ECE 3621 cover the same material with the same prerequisites as ECE 3619, but in two 2 QH courses. *Prereq. ECE 3100 and ECE 3101.*

ECE 3621 Network Synthesis B 2 QH
Spring Quarter
Continues ECE 3620. *Prereq. ECE 3620.*

ECE 3622 Special Topics in Electronics—Analog MOS LSI Circuits 2 QH
Spring Quarter

Covers selected topics of practical importance in the design of analog MOS integrated circuits. Topics include NMOS and CMOS technology and devices, MOS transistor analog switch, digital analog converters, comparators, analog digital converters, sampled analog filtering concepts, switched and capacitor filters. *Prereq. ECE 3331 and ECE 3384.*

ECE 3623 Gate Array Design 4 QH
Fall Quarter

Discusses the design, simulation, verification, and implementation of a CMOS gate array. Describes the VAX-based gate array design and logic simulator tools. Provides design examples of digital logic circuits that will be entered, verified, and simulated. Introduces the GE CMOS Macrocell Circuit Library and TEGAS Logic Simulator. After the completion of this course, the GE Microelectronics Center, at Research Triangle Park, North Carolina, will fabricate the chosen student gate array design projects that can then be tested and evaluated. *Prereq. ECE 3331.*

ECE 3624 Gate Array Design A 2 QH
Winter Quarter

ECE 3624 and ECE 3625 cover the same material with the same prerequisites as ECE 3623, but in two 2 QH courses.

ECE 3625 Gate Array Design B 2 QH
Spring Quarter
Continues ECE 3624. *Prereq. ECE 3624.*

ECE 3626 Integrated Circuits Fabrication Processes 1 4 QH
Winter Quarter

Presents an overview of, and the principles underlying, the basic techniques and processes employed in the fabrication of modern integrated circuits. Topics include crystal growth and epitaxy, oxidation deposition, diffusion and ion implementation, and metallization. Discusses how these processes are combined to yield the current technologies (bipolar, NMOS, CMOS, MESFET). *Prereq. ECE 3101 or equiv.*

ECE 3627 Integrated Circuits Fabrication Processes 1-A 2 QH
Winter Quarter

ECE 3627 and ECE 3628 cover the same material with the same prerequisites as ECE 3626, but in two 2 QH courses. *Prereq. ECE 3101 or equiv.*

ECE 3628 Integrated Circuits Fabrication Processes 1-B 2 QH
Spring Quarter
 Continues ECE 3627. *Prereq. ECE 3627.*

ECE 3629 Integrated Circuits Fabrication Processes 24QH
Fall Quarter, As Announced

Provides an understanding of the state of the art microelectronic fabrication techniques. Advanced topics include electron beam, ion beam and X-ray lithographic techniques as well as dry processes that include plasma etching, ion beam processes, and reactive ion etching. Discusses the concept of gas and plasma kinetics, as well as mechanisms of sputtering and plasma etching future device development and processing requirement. *Prereq. ECE 3626.*

ECE 3630 Integrated Circuits Fabrication Processes 2-A 2 QH
Fall Quarter, As Announced

ECE 3630 and ECE 3631 cover the same material with the same prerequisites as ECE 3629, but in two 2 QH courses. *Prereq. ECE 3626.*

ECE 3631 Integrated Circuits Fabrication Processes 2-B 2 QH
Winter Quarter, As Announced

Continues ECE 3630. *Prereq. ECE 3630.*

ECE 3632 Design and Analysis of Digital Integrated Circuits 4 QH
Winter Quarter, As Announced

Discusses the analysis and design of basic digital-integrated-circuit logic families. Examines bipolar circuits, including the advanced-Schottky TTL, emitter-coupled logic. Explores double-buffered CMOS and NMOS logic gates, including dynamic logic circuits such as domino logic memory cells and basic cells in logic arrays. Reviews design considerations such as propagation delay, switching speed, fan-out, and the effect of parasitics. Correlates design techniques with computer simulations. *Prereq. ECE 3101 or equiv.*

ECE 3633 Design and Analysis of Digital Integrated Circuits A 2 QH
Winter Quarter, As Announced

ECE 3633 and ECE 3634 cover the same material with the same prerequisites as ECE 3632, but in two 2 QH courses. *Prereq. ECE 3101 or equiv.*

ECE 3634 Design and Analysis of Digital Integrated Circuits B 2 QH
Spring Quarter, As Announced

Continues ECE 3633. *Prereq. ECE 3633.*

ECE 3635 Antennas and Radiation 4 QH
Spring Quarter

Focuses on fundamental properties of antennas; linear and aperture antennas including slot, horn, and patch antennas; arrays; receiving antennas; and numerical methods in antenna analysis. Topics include radiowave propagation; antennas over plane and spherical earth; interference, diffraction, surface waves, and ducting; scattering from terrain surfaces; and other propagation topics as time permits. *Prereq. ECE 3341 and ECE 3344.*

ECE 3636 Antennas and Radiation A 2 QH
 ECE 3636 and ECE 3637 cover the same material with the same prerequisites as ECE 3635, but in two 2 QH courses. *Prereq. 3341 and ECE 3344.*

ECE 3637 Antennas and Radiation B 2 QH
 Continues ECE 3636. *Prereq. ECE 3636.*

ECE 3638 Microwave Electron Devices 4 QH
Fall Quarter

Presents the fundamental principles and operation of the major conventional (linear-beam and crossed-field) and novel (maser effect) devices. Examines interactions of non-relativistic and relativistic electron beams with electromagnetic fields; linear-beam tubes (klystron, traveling wave tube, backward-wave amplifier and oscillator, etc.); crossed-field tubes (magnetron, forward and backward cross-field amplifier, high-gain CFA, etc.); and maser-effect devices (cyclotron maser, gyrotron). *Prereq. ECE 3341.*

ECE 3639 Microwave Electron Devices A 2 QH
Winter Quarter

ECE 3639 and ECE 3640 cover the same material with the same prerequisites as ECE 3638, but in two 2 QH courses. *Prereq. ECE 3341.*

ECE 3640 Microwave Electron Devices B 2 QH
 Continues ECE 3639. *Prereq. ECE 3639.*

ECE 3797 Engineer Degree Continuation 0 QH
Any Quarter

Candidates sign up for thesis continuation if their thesis is not completed after they have registered for three consecutive quarters or 10 QH of EE degree thesis. Continuous registration is required until the candidate graduates.

ECE 3798 Master's Thesis Continuation 0 QH
Any Quarter

ECE 3799 Doctoral Dissertation Continuation 0 QH
Any Quarter

ECE 3860 Master's Thesis 8 QH
Any Quarter

Offers analytical and/or experimental work conducted under the auspices of the department. *Prereq. BS degree in engineering or science.*

ECE 3861 Master's Thesis 4 QH
Any Quarter

ECE 3862 Master's Thesis 2 QH
Any Quarter

ECE 3870 Engineer Degree Thesis 8 QH
Any Quarter

Offers analytical and/or experimental work conducted under the auspices of the department. Minimum of 4 QH, maximum of 8 QH allowed per quarter. *Prereq. Admission to Engineering Degree Program.*

ECE 3871 Engineer Degree Thesis 4 QH
Any Quarter

ECE 3872 Engineer Degree Thesis 2 QH
Any Quarter

ECE 3880 Doctoral Thesis 0 QH**Any Quarter**

Offers theoretical and/or experimental work conducted under the auspices of the department. *Prereq. Passing of PhD qualifying exam.*

ECE 3887 Master's Seminar 1 2 QH**Any Quarter**

Involves a library survey of a selected topic in the general field of electrical engineering with an oral presentation based on this survey. Requires participation in the departmental seminar program of guest lectures. *Prereq. BS degree in engineering or science.*

ECE 3888 Master's Seminar 2 2 QH**Any Quarter**

Requires the preparation of a research paper suitable for publication in a professional journal, plus an oral presentation of this report. *Prereq. ECE 3887.*

ECE 3889 Doctoral Seminar 0 QH**Any Quarter**

Requires presentation of a seminar to the electrical engineering department on a subject related to a PhD thesis. The thesis supervisor will coordinate the seminar. *Prereq. Passing of PhD qualifying exam.*

ECE 3892 Doctoral Reading 0 QH**Any Quarter**

Includes only material approved by the candidate's adviser. *Only S or F grades will be assigned for this course. Prereq. Passing of PhD qualifying exam.*

ECE 3893 Special Problems in Electrical Engineering 2 QH**Any Quarter**

Offers theoretical or experimental work under individual faculty supervision. *Prereq. Permission of department chair.*

ECE 3894 Engineer Degree Reading 4 QH

Taken upon completion of 30 QH of satisfactory course work. *No credits toward course requirements are given. Minimum of 4 QH, maximum of 8 QH allowed per quarter.*

ECE 3895 Engineer Degree Reading 8 QH**Any Quarter****ECE 3896 Special Problems in Electrical Engineering 4 QH****Any Quarter**

Biomedical Engineering
INT 3250 Engineering and Medicine 1 2 QH**Fall Quarter**

Discusses the intersection of technology with medicine, historical development of bioengineering profession, and its impact on society. Studies activities embraced by the profession today, including educational, training, and career opportunities in clinical, biomedical, and medical engineering for individuals at the BS, MS, and PhD levels. Examines future goals of engineering in biology and medicine, and issues basic to the relationship between new medical technology and the efficiency and effectiveness of the health care system. *Prereq. Permission of instructor.*

INT 3251 Biomedical Applications of Heat and Mass Transfer 2 QH**Winter Quarter**

Studies bioheat equation, thermal transport in living systems, thermal properties, and thermal techniques

in the measurement of blood flow. Presents applications of heat transfer in medicine including hyperthermia for cancer therapy, hypothermia for tissue and organ preservation and cryosurgery, thermal sources for implantable artificial heart, and thermography in cancer detection. *Prereq. Permission of instructor.*

INT 3252 Selected Topics in Bioengineering 2 QH**Spring Quarter**

Explores biomedical engineering topics selected from fields of biomaterials, nuclear medicine, radiation diagnosis and therapy, biological transport processes, artificial organs, rehabilitation engineering, and microprocessor based clinical instruments. Introduces medical technology assessment. *Prereq. INT 3250 or permission of instructor.*

Industrial Engineering

Each course description includes information on the quarter in which classes are usually offered. The quarters listed are presented for planning; however, the Graduate School of Engineering cannot guarantee that all courses will be offered. Students must refer to the Graduate School of Engineering Quarterly Course Offering sheets to determine what courses are actually offered in any given quarter.

IIS 3100 Basic Engineering Economy 2 QH

Fall and Winter Quarters

Presents economic analysis in formulating business policies and selecting alternatives from possible engineering solutions to industrial problems, present worth, annual cost, and rate of return techniques using discrete compound interest calculations. *Prereq.* BS degree in engineering or science.

IIS 3101 Industrial Accounting for Engineers 2 QH

Fall, Winter, and Spring Quarters

Introduces basic accounting principles and procedures, including use of accounting data as a management tool. Covers basic cost accounting procedures related to materials, labor, and manufacturing expense cost control. Topics include job order, process, and standard cost systems.

IIS 3102 Introduction to Human Factors Engineering 2 QH

Fall and Winter Quarters

Surveys the principal topics and areas of concentration in the field. Introduces sensory physiology and sensory performance; basic motor capabilities and limitations; concepts of the human as a processor of information; and methods of gathering human performance data. *Normally the first course in the human factors areas for students without behavioral science background. Prereq.* IIS 3113 or permission of instructor.

IIS 3103 Basic Operations Research 4 QH

Winter and Spring Quarters

Introduces the theory and use of deterministic and stochastic models to represent industrial operations. Discusses models of linear programming, dynamic programming, inventory control, waiting lines, and Markov Chains. *Prereq.* IIS 3113.

IIS 3110 Pascal for Information Systems 4 QH

Fall and Spring Quarters

Provides the essentials of Pascal sufficient to support data structure concepts. Topics include algorithms and flow charting, Boolean logic, if-then-else, case, do-while and repeat statements, procedures and functions, one- and two-dimensional arrays, recursion, string processing, records, sets, text files, and pointers and linked lists. *Prereq.* Admission to graduate program.

IIS 3111 Principles of COBOL 2 QH

Fall and Winter Quarters

Presents fundamentals of computer programming in COBOL. Topics include elementary computer functioning, program organization, input/output operations, arithmetic and data-handling verbs, and program logic development through the use of flow charts. Introduces storage and manipulation of large data files on magnetic tape. *No prior computer experience is required. Prereq.* Admission to graduate program.

IIS 3112 Quantitative Methods for Information 4 QH

Systems

Fall and Winter Quarters

Focuses on the theory and use of deterministic and stochastic models in the context of computer and information systems. Includes models of linear programming, dynamic programming, Monte Carlo simulation, Gantt and Pert charts, multicriteria decision analysis, and waiting lines. Emphasizes applications in a computer and information systems environment. *Prereq.* Admission to graduate program and IIS 3113.

IIS 3113 Basic Probability and Statistics 4 QH

Fall, Winter, and Spring Quarters

Offers fundamental concepts of probability. Presents events, same space, discrete and continuous random variables. Discusses density functions, mass functions, cumulative probability distributions, and moments generating functions. Explores expectation of random variables, as well as common discrete and continuous probability distributions including binomial, poisson, geometric, uniform, exponential, and normal. Topics also include multivariate probability distributions, covariance and independence of random variables, sampling and descriptive statistics, parameter estimation, confidence intervals, and hypothesis testing. *Prereq.* Admission to graduate program.

IIS 3116 Assembly Language 4 QH

Fall Quarter

Studies microcomputer programming in assembly language, emphasizing structured programming techniques, interrupts, and input/output devices. Introduces microprocessor programming model, instruction set, and addressing modes. Discusses microcomputer system architecture, system resources, interrupt processing, and input/output interfaces. Explores using an assembler and debugger on the IBM-PC, as well as the 8088 instruction set in connection with making interrupt calls to the IBM-DOS. Exercises in data transfer, graphics, and music programs. A macro assembler will be used to write programs. *Prereq.* Higher-level language.

IIS 3200 Organizational Perspectives and Project 4 QH

Management

Spring Quarter

Surveys business organization, management, and operation, including business responsibility to its employees, its product, the customer, and the environment in which it operates. Covers planning, forecasting, and budgeting, the financial markets, investing and speculating, as well as the interaction of politics, government and government controls on the industrial enterprise. *Prereq.* Admission to graduate program.

**IIS 3204 Engineering/Organizational Psychology 4 QH
Fall Quarter**

Analyzes the purpose and functioning of organizations as the basic networks for achieving goals through coordination of effort, communication, and responsibility. Emphasizes the role and function of engineering organizations based on modern behavioral science concepts. Covers the application of psychology to industry relative to human relations, group dynamics, tests and measurements, personnel practices, training, and motivation. *Prereq. Admission to graduate program.*

**IIS 3205 Industrial Organizations 2 QH
Winter Quarter**

IIS 3205 and IIS 3206 cover the same material as IIS 3204, but in two 2 QH courses.

**IIS 3206 Industrial Psychology for Engineers 2 QH
Spring Quarter**

IIS 3205 and IIS 3206 cover the same material as IIS 3204, but in two 2 QH courses. *Prereq. IIS 3205.*

**IIS 3207 Financial Management 4 QH
Fall and Winter Quarters**

Studies the issues and processes of short-term financing on industrial firms. Offers financial analysis of cases, supplemented by readings to develop familiarity with sources and uses of working capital as well as the goals and problems involved in its management. Covers the analysis necessary for such long-term financial decisions as issuance of stock or bonds; contracting of leases or loans, and financing of a new enterprise; mergers, capital budgeting, the cost of capital, and the valuation of a business. *Prereq. IIS 3101.*

**IIS 3216 Advanced Engineering Economy 2 QH
Winter Quarter**

Emphasizes the practical application of the techniques studied in basic engineering economy. Explores the problems of implementation through class discussion of cases and student projects, as well as recent advances in the techniques of engineering economy, especially those relating to the consideration of uncertainties. *Prereq. IIS 3100.*

**IIS 3217 Engineering Project Management 4 QH
Winter and Spring Quarters**

Studies the optimization of schedules utilizing pertinent software tools such as the linear programming and project management packages. Examines other graphics software used to draw project diagrams such as Gantt charts, PERT diagrams, manpower loading charts, and funding charts. Considers determination of the critical path and comparison of actual performance with the planned schedule, and discusses the systems life cycle. Addresses needs analysis, requirements definition, preliminary design, detailed design, and implementation in the context of project management.

**IIS 3218 Planning and Managing Information Systems Development 4 QH
Spring Quarter**

Considers the computer system development life cycle, and interactions between the system and the organiza-

tion. Discusses design parameters and tradeoffs, planning for externalities, and individual and organizational aspects of human decision making. Explores the systems approach to planning, management, and control of effective information systems development. Based on extensive use of case studies and will include some guest speakers. *Prereq. IIS 3615.*

**IIS 3219 Cost Accounting and Industrial Budgeting 4 QH
Fall and Spring Quarters**

Studies and evaluates cost accounting procedures in terms of being considered by the engineer for cost determination of alternative engineering proposals and for input into various budgeting plans with which the engineer may become involved. Introduces the essentials of fixed and variable budgeting for production, inventory, sales, cash, capital, and cost-volume profit analysis. *Prereq. IIS 3101.*

**IIS 3220 Development of Engineering Personnel 4 QH
Fall Quarter**

Considers the science and art of managing creative people employed in research, developmental, and engineering activities. Devotes attention to behavioral theories and their applications in the practice of management. Emphasizes each student's experience as an employee or manager. *Prereq. Admission to graduate program.*

**IIS 3302 Advanced Work Design 2 QH
Spring Quarter**

Studies the basic philosophies of work design. Discusses implementation of work design concepts with case studies, and studies and analyzes models such as work sampling, sequence or flow of work models, repetitive and nonrepetitive work models, and work measurement models such as standard data. Topics include human factors in measuring operator performance, regression analysis approaches and emphasizes development of professional, analytical, and managerial skills and abilities at a systems level. *Prereq. BS degree in engineering or science.*

**IIS 3303 Product Design and Value Analysis 2 QH
Winter Quarter**

Studies design parameters and their effect on development, manufacturing, and procurement. Focuses on functional analysis of components and systems, and includes complete projects and case studies. *Prereq. BS degree in engineering or science.*

**IIS 3304 Production Analysis 4 QH
Fall Quarter**

Presents modern quantitative techniques of production planning and control considering deterministic and probabilistic models. Topics include project planning, forecasting, aggregate planning and master scheduling, inventory analysis and control, materials requirement planning, job shop scheduling and dispatching problems. *Prereq. IIS 3103 and IIS 3113.*

**IIS 3305 Case Studies in Industrial Engineering 2 QH
Spring Quarter**

Considers the formulation of problems and analysis of situations on topics such as work measurement, line

balancing, plant layout, regression analysis, wage and salary administration, management information systems and network analysis. Includes class discussion and written analysis of a variety of cases. *Prereq.* IIS 3304 and IIS 3523.

IIS 3307 Introduction to Microprocessors 2 QH
Winter Quarter

Introduces advanced microprocessor systems, including the basic concepts of system architecture, interfaces, and programming using modern 16- and 32-bit microprocessor families. Discusses CPU programming model, instruction set, addressing modes, and exception processing. Topics covered include privilege states, memory management, bus control, principles of assembly language programming, two microprocessor families, and MC 68000 and iAPX 86. *Prereq.* *Structured higher-level language.*

IIS 3308 Microcomputer Applications 2 QH
Spring Quarter

Introduces microcomputer applications in local networks. Focuses on multi-microcomputer systems, bus topology interconnection, communication architecture, and protocols. Examines examples of microcomputer-based local network nodes, local network model, and protocol development. Discusses token bus and collision detection protocols. *Prereq.* *Structured higher-level language and IIS 3307 or equiv.*

IIS 3309 Computer Methods in Manufacturing 4 QH
Fall Quarter

Investigates the use of computers in selected areas of manufacturing systems design. Topics may include numerical control, MRP, process planning and control, and other important applications of computers to manufacturing systems. *Prereq.* IIS 3311 or permission of instructor.

IIS 3310 Manufacturing Methods and Processes 4 QH
Spring Quarter

Explores the structures of polymers (thermoplastic, thermosetting, and glasses) and the manufacturing processes for polymers including thermoforming. Presents the structure of metals and the manufacturing processes for metal forming. Includes a discussion of alloys and welding and brazing. *Prereq.* BS degree in engineering or science.

IIS 3311 Computer-Aided Manufacturing 4 QH
Spring Quarter

Provides an overview of computer-aided manufacturing. Covers the areas that encompass the term CAM: group technology, material requirements planning, part coding and classification, numerical control, part programming and management systems. Broad coverage of each of the areas is given to allow the student to gain an appreciation of the automated factory. *Prereq.* *Higher-level language.*

IIS 3312 Forecasting and Inventory Control 4 QH
Winter Quarter

Examines econometric methods of forecasting the demand for industrial products and emphasizes techniques applicable to individual companies and the total

demand. Uses mathematical model of the causal factors with special attention to determining the reliability of the model. Studies the design and operation of inventory systems from a scientific management point of view, including both required theory and practical aspects. Subjects include inventory control models and techniques, production planning, and control models and methods. *Prereq.* IIS 3103 and IIS 3523.

IIS 3400 Human Factors Engineering 4 QH
Winter Quarter

Covers sensory motor and work environment considerations. Topics include the design of equipment and systems for human use, with the application of engineering psychology; visual and auditory presentation of information; human information processing and skilled task performance. Examines the human as a work-performing, heat-generating physiological engine, and the implied restrictions on the equipment and workplace to provide occupational safety and effective human/machine performance. *Prereq.* IIS 3102.

IIS 3403 Occupational Health and Safety 4 QH
Winter Quarter

Considers safety responsibilities of management and employees, recognition of chemical, electrical, and mechanical hazards, principles of machine guarding, and accident investigation and cost analysis. Reviews record keeping requirements under OSHA Act of 1970, safety programs and inspections, safety training, toxicology, and first aid and medical services. Studies fire prevention and control methods, occupational diseases, and personnel protective equipment. *Prereq.* Admission to graduate program.

IIS 3406 Man/Computer Interaction 2 QH
Spring Quarter

Examines the design and evaluation of the human/computer interface in on-line information systems. Discusses formatting of visual displays and auditory outputs, techniques to facilitate operator inputs, pacing and control of the interactive sequence, operator training, task analysis, and performance testing. Student projects in areas of novel application. *Prereq.* IIS 3401.

IIS 3410 Advanced Human Factors Engineering 4 QH
Winter Quarter

Studies the methods and techniques used to obtain and interpret human performance data. Includes examination of experimental methods and problems peculiar to experimentation with human subjects, unobtrusive measures, and nonreactive techniques, survey design and implementation, and systematic observation techniques. Covers systems analysis and human/machine systems, function and task analysis, task allocation, support equipment and training design, error analysis, occupational safety, preconstruction, and periodic and accident/critical incident analytic techniques. *Prereq.* IIS 3509 and IIS 3400.

IIS 3503 Simulation Methodology and Applications 4 QH
Winter and Spring Quarters

Discusses when, where, and how to use discrete event simulation techniques. Topics include model design,

development, and validation; tactical and strategic planning considerations in the use of the model; input data reduction; alternative programming languages for implementing models; efficiency in running simulations, and statistical reliability in the design and analysis of simulation experiments. Considers special purpose simulation languages, such as SIMSCRIPT, GPSS, and SIMAN. *Prereq.* IIS 3523 and higher-level language.

IIS 3509 Design of Experiments 4 QH
Fall Quarter

Examines the theory and application of experimental design techniques such as modeling and statistics that can optimize resources and improve decision making risks. Covers experiments with single and multiple factors of interest and consider experiments with high order experimental restrictions. Some additional analyses techniques will also be covered. *Prereq.* IIS 3523.

IIS 3512 Stochastic Modeling and Queuing Systems 2 QH
Spring Quarter

Develops the probability techniques necessary for the study of queues, Poisson process, and semi-Markov and Markov process. Analyzes the behavior of queueing systems, single and multiple queues, queues with general arrival and general server, and queues with priority. *Prereq.* IIS 3113.

IIS 3513 Network Analysis and Advanced Linear Programming 4 QH

Examines concepts of network analysis and advanced linear programming. Topics include spanning trees, path and flow algorithms, matchings and coverings, postman and traveling salesman problems, location problems, revised simplex and polynomial bounded algorithms, parametric programming, and concepts of upper bounding and decomposition. *Prereq.* IIS 3103.

IIS 3514 Advanced Operations Research 4 QH
Winter Quarter

Studies important families of mathematical programming problems and optimization methods. Examines generalized networks including the transshipment, shortest route, maximal flow, and the minimal spanning tree problems. Presents the cutting plane and the branch and bound algorithm for binary and mixed integer programming problems. Introduces nonlinear programming including unconstrained optimization, the Kuhn-Tucker conditions, gradient methods, separable, quadratic, and geometric programming. *Prereq.* IIS 3103.

IIS 3516 Statistical Quality Control 4 QH
Fall Quarter

Studies the fundamental concepts of quality planning and improvements. Covers analysis and application of modern statistical process control methods, inspection error, and design of sampling plans. Covers software quality assurance and examines the concepts of Deming, Ishikawa, Feigenbaum, and Taguchi's approach in quality planning, organization, and improvement. *Prereq.* IIS 3113.

IIS 3517 Statistical Decision Theory 2 QH
Winter Quarter

Explores the use of Bayesian statistical inference to arrive at decisions when stochastic variables are interacting. Topics include the relationship to game theory; decision making over time in a sequence; important expected values and distributions; and relationship of Bayesian decision theory to classical statistical inference. *Prereq.* IIS 3506 and IIS 3523.

IIS 3522 Systems Engineering Design and Analysis 4 QH
Spring Quarter

Covers principles of systems modeling and analysis using continuous simulation techniques. Topics include differential equations as system models; Laplace transformations; numerical approximation techniques; stability; steady-state error; control actions; alternative modeling scheme; and validation of system models via continuous simulation techniques. Emphasizes concepts from the production and service-oriented industries. *Prereq.* Higher-level language.

IIS 3523 Applied Statistics 4 QH
Fall and Spring Quarters

Offers development of complete statistical models for the predication and analysis of random phenomena. Topics include goodness of fit and nonparametric tests, analysis of variance, and simple and multiple regression. Introduces the design of experiments, quality control, decision analysis, reliability, and risk assessment. *Prereq.* IIS 3113.

IIS 3524 Advanced Operations Research Topics 4 QH
Spring Quarter

Topics include the revised simplex algorithm, parametric linear programming, and the decomposition principle for large size multidivisional problems. Introduces multi-criteria decision analysis, including the generation of the nondominated solution set, goal programming, evaluation of nondominated solutions, and multi-criteria optimization applications. *Prereq.* IIS 3103.

IIS 3525 Introduction to Reliability Analysis and Risk Assessment 4 QH
Winter Quarter

Introduces probability theory, classical and Bayesian statistics useful for reliability analysis of large, and complex systems. Covers Bayesian probability encoding of experience data, principles of the methods of risk assessment, and reliability analyses including fault trees, decision trees, and reliability block diagrams. Examines practical applications to industrial operations—for example, nuclear and chemical plants, military systems, and large processing plants. *Prereq.* IIS 3113 or permission.

IIS 3526 Advanced Reliability Analysis, Risk Assessment, and Maintenance 4 QH
Spring Quarter

Considers extended application and use of reliability and probabilistic risk analysis methods. Explores methods for common cause/dependent failure analysis, human reliability analysis, and treatment of uncer-

ainties. Examines Bayesian statistics applied to data analysis and discrete probability distribution (DPD) arithmetic for propagation of uncertainty. Studies time-dependent reliability analysis; data types, variable, and constant declarations; enumerations, arrays, sets, records, and pointers; and input/output library functions. Presents the control structures of Modula-2: procedures, modules, and visibility control. Covers sequential and screen-oriented input/output; recursion, concurrency, and low-level facilities; and software design using structured charts. *Prereq.* Admission to graduate program and IIS 3525.

IIS 3535 Reliability Engineering and Testing 4 QH

Introduces the evolving methodology of reliability as a design parameter. Studies the problems of quantifying, assessing, and verifying reliability. Presents various factors that determine the stress and strength of components and their impact on system reliability. Topics include practical applications, examples, and problems in a range of engineering fields, such as mechanical, electrical, industrial, computer structures, and automatic control systems. *Prereq.* IIS 3113.

IIS 3540 Total Quality Control for Engineering 4 QH

Studies principles of Total Quality Control (TQC). Examines Japanese management methods for technologies: manufacturing, electrical, steel and automobile industries. Covers seven statistical methods of TQC: histograms, cause and effect diagrams, check sheets, Pareto diagrams, graphs, control charts, and scatter diagrams. Uses case studies of TQC implementation in technology management with guest lectures by experts. *Prereq.* IIS 3113.

IIS 3601 Compiler Design 4 QH **Winter Quarter**

Introduces data structures, including stacks and trees, the nature of compiling and interpreting, string manipulation, and code generation. Includes the writing of a compiler in assembly language of a BASIC-like source language as a term project. *Prereq.* IIS 3115, IIS 3116, or IIS 3117.

IIS 3604 Data Structures and Database Management 4 QH **Fall and Winter Quarters**

Topics include arrays, stacks, lists, linked lists, queues, trees, graphs, symbol tables, and files. Presents a model of each data structure and discusses various implementations in a high-level language. Analyzes algorithms for handling data and shows applications of particular structures in order to emphasize the role of abstraction in problem solving with computers. Covers searching and sorting techniques. *Prereq.* IIS 3106 or IIS 3110.

IIS 3607 Operating Systems and Systems Software 4 QH **Winter and Spring Quarters**

Studies the concept and components of modern operating systems; including evolution of modern operating systems, operations and services of operating systems; file systems, protection, and implementation; scheduling of processors, multiprogramming; memory management, partitions, virtual memory, overlap, and allocation algorithms. Covers secondary memory

management, scheduling of disks and drums; operating systems deadlocks, detection and prevention; concurrent processes, semaphores, concurrent programming, and synchronization; operating system protection, access matrix, design issues, multilayered approach, and virtual machines. Presents case studies in UNIX, VMS, TOPS, and MULTICS. *Prereq.* IIS 3604 and IIS 3610.

IIS 3610 Computer Architecture 4 QH

Fall and Spring Quarters

Surveys the structure and organization of modern computers, considering digital logic circuits, integrated circuits, and programmed logic arrays. Studies memory organizations, design techniques for large scale memories, and microprocessors. Discusses comparative study of Z80 and MC 68000; interfacing and I/O chips; design specifications of model microcomputers; and microprogramming. Examines the organization of data path and microarchitecture; instruction formats; operating system concepts; assemblers, linkers, and loaders. Topics include multi-level machines and program portability; special topics on super computer architecture; multiprocessors; and non-von Neumann architecture. *Prereq.* IIS 3116.

IIS 3615 Analysis and Design of Computer 4 QH **Information Systems**

Fall Quarter

Introduces computer information systems analysis and design techniques and the hardware and software that support such systems. Topics include techniques for determining information requirements for MIS/DSSs, development of the functional systems design and computer system design considerations such as the CPU, main memory, operating systems functions, computer languages, input devices, secondary memory, file organization, database management systems, data communications, data security, and output and display devices. Aims to provide capability in the skeletal design of a computer system to support a given set of management needs. *Prereq.* Admission to graduate program.

IIS 3620 Computerized Financial Control Systems 2 QH **Spring Quarter**

Considers on-line systems for financial and inventory control from the technological, legal, and social point of view. Focuses on electronic funds transfer (EFT), point of sale (POS) terminals, and associated computing equipment. Emphasizes equipment used for interbank and consumer banking transactions, debit card transactions, and retail management information systems to control cash and inventory. Discusses the current technological status and societal implications of EFT and POS terminals. *Prereq.* IIS 3615.

IIS 3621 Information Systems and Society 2 QH **Fall Quarter**

Analyzes the role computer systems play in modern society. Contrasts the beneficial use of computers in commercial and industrial enterprises with the potential for infringement of individual privacy rights. Discusses sufficient technical material on computer hardware, software, and data communications to permit

assessment of system feasibility and reviews relevant major legislation that affects the use of computer systems. IIS 3621 and IIS 3617 cover the same material as IIS 3218, but in two 2 QH courses. *Prereq.* Admission to graduate program.

IIS 3622 Information Systems in a Microcomputer Environment 4 QH
Spring Quarter

Explores the role of microcomputers and local area networks in providing decision support information, using the IBM PC, or compatible machine as a representative microcomputer. Topics include PC operating system and hardware fundamentals, software selection for microcomputer based information systems (MBIS), data communications and local area networks of PCs, and approaches to the design and evaluation of MBISs. Assignments using the PC provide the opportunity to understand its capabilities and limitations and evaluate rational approaches to the selection of generic categories of PC software. *Prereq.* IIS 3615 or equiv.

IIS 3623 File Processing 2 QH
Winter Quarter

Studies the processing of sequential, indexed-sequential, and direct/relative data files on tape and disk. Considers record blocking, searching, sorting, and merging operations, and random access techniques. Introduces database management concepts, and if time permits, RPG. *Prereq.* Knowledge of COBOL programming or IIS 3111.

IIS 3624 Software Engineering I 4 QH
Winter Quarter

Introduces software design techniques, software requirements, and specifications. Examines system architecture design methodology, including classifications, top-down, bottom-up, HIPO, Warnier-Orr, and Jackson design methodologies. Studies data flow charts, module strength and independence, software reliability, and maintainability in the design stage. Considers elements of programming methodology, such as style, tools, environments, and documentation. Discusses software project management, and analyzes programming languages in the light of software engineering principles. *Prereq.* IIS 3604.

IIS 3625 Software Engineering 2 4 QH
Spring Quarter

Presents advanced topics in software engineering. Covers software complexity measures, memory requirements and processing time analysis, program testing and debugging methods, proving programs correct; implementation issues, and elements of reliability theory and applications to software engineering. Examines management of software design projects, as well as software efficiency principles through case studies of large software projects. Investigates application and comparison of various software development tools. *Prereq.* IIS 3607 and IIS 3624.

IIS 3626 Networks and Telecommunications 4 QH
Winter and Spring Quarters

Studies network goals and applications, including architecture, topologies, and protocols. Considers lay-

ered communications protocol design, such as layer functions, interlayer interfaces, and peer processes. Topics include performance measures, data communication techniques, wide area and local networks, channel interfaces and access schemes, workstations and server nodes, distributed systems, and internetworking. *Prereq.* IIS 3610.

IIS 3627 Software Economics 4 QH
Winter Quarter

Examines the constructive cost model (COCOMO model) in the context of the software life cycle through the analysis of case studies. Presents economic analysis tools relative to software development and/or selection, marginal analysis, present value, future worth, and systems analysis techniques. Discusses methods for dealing with uncertainty and performing risk analyses, a seven step program for estimating software cost, COCOMO cost drivers, evaluation procedures, and software project planning and control. *Prereq.* IIS 3624.

IIS 3628 Database Management Systems 4 QH
Fall, Winter, and Spring Quarters

Examines fundamental concepts and design of database management systems (DBMS). Topics include the role of DBMS in organizations; alternative database models—hierarchical, network and relational; underlying data structures for each database model; example DBMS for each model type; design of an information system using a DBMS approach; and practical experience with at least one DBMS on a micro- or mini-computer, such as RBase 5000 or Data-Trieve. *Prereq.* IIS 3604.

IIS 3629 Expert Systems in Engineering 4 QH

Introduces students to the theory, topics, and applications of expert systems in engineering. Topics include knowledge representation formats (production rules, frames, networks, logic systems), heuristics in engineering (deterministic and nondeterministic), fuzzy logic, certainty factors, cognition, memory, decision strategies, design of expert systems, shells, current research goals, and applications in engineering. *Prereq.* Admission to graduate program.

IIS 3630 Introduction to Machine Intelligence 4 QH

Examines intelligent computer systems that exhibit behavior normally attributed to humans: solving problems, reasoning, learning, and handling collections of expert knowledge. Focuses on methods, techniques, and implementations of computer systems for problem solving in engineering. Uses logic and predicate calculus as a starting base; all other representations are explained in terms of the predicate calculus representation. *Prereq.* A strong background in structured programming methods (IIS 3106 or equiv.) and data structures (IIS 3604 or equiv.) is required. Lisp or Prolog is desirable but not necessary.

IIS 3631 Machine Learning 4 QH

Introduces the problem of developing programs that can learn (that is, increment their knowledge in the process of execution). Covers basic principles, techniques, tools, and algorithms for building learning systems. Concentrates on the use of learning algorithms

in software rather than on the human learning mechanisms. Discusses classification of machine learning methodology, algorithms, and programs, as well as current machine learning research being conducted throughout the world. *Prereq.* A high-level programming language (*Lisp or Prolog preferable*), and an introductory course to machine intelligence (*IIS 3630 or equiv.*).

IIS 3637 Programming Languages for Software Engineering 4 QH
Fall Quarter

Introduces programming languages through available procedural languages and the principles of their design and implementation. Surveys languages historically and provides insight into aspects of programming languages such as control structures, parameter passing conventions, run-time structures, and binding time. Provides exposure to modern representative languages, including limited hands-on experience with block-structure languages, object-oriented languages, and languages for list processing and logic programming. *Prereq.* IIS 3604.

IIS 3651 Software Engineering Project 8 QH
Spring Quarter

Offers individual work under faculty supervision. Projects highlighting typical software engineering problems could include: development of integratable RAM resident software for desk-top functions; operating systems development; database management systems; an enhanced word processor—spelling checker—document formatter; language and compiler projects; development of software engineering tools; or software for an engineering workstation. *Prereq.* IIS 3624, or permission of instructor.

IIS 3652 Software Engineering Project 1 4 QH
Spring Quarter

IIS 3652 and IIS 3653 cover the same material as IIS 3651, but in two 4 QH courses.

IIS 3653 Software Engineering Project 2 4 QH
Spring Quarter

IIS 3652 and IIS 3653 cover the same material as IIS 3651, but in two 4 QH courses.

IIS 3797 Engineer Degree Continuation 0 QH
Any Quarter

IIS 3798 Master's Thesis Continuation 0 QH
Any Quarter

IIS 3799 Doctoral Dissertation Continuation 0 QH
Any Quarter

IIS 3801 Special Project in Industrial Engineering 2 QH
Any Quarter
Offers individual work under faculty supervision. *Prereq.* Permission of instructor.

IIS 3802 Special Project in Industrial Engineering 4 QH
Any Quarter
Same as IIS 3801.

IIS 3803 Independent Study in Operations Research 2 QH
Any Quarter

Presents special topics in operations research by arrangement with a faculty member.

IIS 3804 Special Topics 4 QH
Any Quarter

Offers special topics in IE and IS. *Prereq.* Permission of instructor.

IIS 3805 Special Topics 2 QH
Any Quarter

Offers special topics in IE and IS. *Prereq.* Permission of instructor.

IIS 3806 Seminar in Industrial Engineering 2 QH
Any Quarter

Involves presentations of thesis-related topics by students, as well as presentations and discussions by faculty and eminent people in the field on timely industrial engineering topics. Includes field trips and visitations where appropriate. *Prereq.* Permission of instructor.

IIS 3863 Master's Thesis 2 QH
Any Quarter

Offers analytical and/or experimental work conducted under the auspices of the department. *Prereq.* Permission of adviser.

IIS 3864 Master's Thesis 4 QH
Any Quarter

Same as IIS 3863.

IIS 3865 Master's Thesis 8 QH
Any Quarter

Same as IIS 3863.

IIS 3870 Industrial Engineer Degree Project 0 QH
Any Quarter

Undertaken with the approval of the candidate's adviser and the department graduate committee.

IIS 3873 Industrial Engineer Degree Project 4 QH
Any Quarter

Same as IIS 3870.

IIS 3874 Industrial Engineer Degree Project 2 QH
Any Quarter

Same as IIS 3870.

IIS 3881 Doctoral Thesis 8 QH
Any Quarter

Doctoral thesis research conducted under advisership of the doctoral student's dissertation committee.

IIS 3883 Doctoral Thesis 4 QH
Any Quarter

Same as IIS 3881.

IIS 3884 Doctoral Thesis 2 QH
Any Quarter

Same as IIS 3881.

Mechanical Engineering

Each course description includes information on the quarter in which classes are usually offered. The quarters listed are presented for planning; however, the Graduate School of Engineering cannot guarantee that all courses will be offered. Students must refer to the Graduate School of Engineering Quarterly Course Offering sheets to determine what courses are actually offered in any given quarter. "Odd" and "even" years refer to the fall quarter of the academic year, for example, spring 1990 of the 1990-1991 academic year, would be an "odd" year.

ME 3100 Mathematical Methods for Mechanical Engineers 4 QH
Fall Quarter
 Embodies the material in ME 3101 and ME 3102. *Prereq.* Admission to the Graduate School of Engineering.

ME 3103 Mathematical Methods for Mechanical Engineers 1 2 QH
As Announced
 Presents Bessel and Legendre functions, boundary-value problems and series of orthogonal functions. Discusses partial differential equations and applications to heat transfer, fluid flow, vibrations, and wave propagation. *Prereq.* Admission to the Graduate School of Engineering.

ME 3102 Mathematical Methods for Mechanical Engineers 2 2 QH
As Announced
 Considers vector analysis, divergence theorem, functions of a complex variable, Laurent series and singular points, residues and contour integration, and applications. *Prereq.* Admission to the Graduate School of Engineering.

ME 3120 Theory of Elasticity 4 QH
Fall and Winter Quarters
 Embodies the material in ME 3121 and ME 3122. *Prereq.* Admission to the Graduate School of Engineering.

ME 3121 Theory of Elasticity 1 2 QH
As Announced
 Analyzes Cartesian tensors using indicial notation. Explores stress and strain concepts, point stress and strain, relation to tensor concepts, and governing equations for the determination of stress and displacement distributions in a solid body. Examines exact solutions of the governing equations for elastic solids. *Prereq.* Admission to the Graduate School of Engineering.

ME 3122 Theory of Elasticity 2 2 QH
Winter Quarter
 Considers plane stress and strain problems in rectangular and polar coordinates including thermal stress, and the relation of elasticity theory to strength of materials. Topics include torsion of prismatic and axially symmetric bars, and the bending of thin flat rectangular and circular plates. *Prereq.* ME 3121.

ME 3140 Advanced Dynamics 4 QH
Winter and Spring Quarters
 Embodies the material in ME 3141 and ME 3142. *Prereq.* Admission to the Graduate School of Engineering.

ME 3141 Advanced Dynamics 1 2 QH
As Announced
 Studies kinematics of particles and rigid bodies, modeling and application of fundamental laws of motion, and dynamic response of lumped parameter systems. *Prereq.* Admission to the Graduate School of Engineering.

ME 3142 Advanced Dynamics 2 2 QH
As Announced
 Continues ME 3141. Topics include Lagrange's equations, applications in two and three dimensions, and introduction to vibrations. *Prereq.* ME 3141.

ME 3200 General Thermodynamics 4 QH
Winter Quarter; Spring Quarter, Odd Years
 Examines fundamentals of equilibrium thermodynamics. Topics include work, energy, heat, temperature, available energy, entropy, first and second laws of thermodynamics, and simple systems. Covers closed and open systems, availability loss and irreversibility, heat engines, multicomponent systems, mixtures of gases, chemical reactions, and chemical equilibrium. Equivalent to courses ME 3201 and ME 3202. *Prereq.* Admission to the Graduate School of Engineering.

ME 3201 General Thermodynamics 1 2 QH
As Announced
 ME 3201 and ME 3202 present the same material contained in ME 3200 but in two 2 QH courses. *Prereq.* Admission to the Graduate School of Engineering.

ME 3202 General Thermodynamics 2 2 QH
As Announced
 Continues ME 3201. *Prereq.* ME 3201.

ME 3210 Essentials of Fluid Dynamics 4 QH
Fall Quarter; Winter Quarter, Even Years
 Introduces fluid dynamics as preparation for more advanced courses in the thermofluids curriculum, providing a strong background in fluid mechanics. Topics may include Cartesian tensors, differential and integral formulation of the equations of conservation of mass, momentum, and energy. Covers molecular and continuum transport phenomena; the Navier-Stokes equations; vorticity; inviscid, incompressible flow, the velocity potential, and Bernoulli's equation; viscous incompressible flow; the stream function; some exact solutions; and energy equation including heat conduction and viscous dissipation. This material is also covered in the two 2 QH courses ME 3211 and ME 3212. *Prereq.* Admission to the Graduate School of Engineering.

- ME 3211 Essentials of Fluid Dynamics 1** 2 QH
As Announced
ME 3211 and ME 3212 present the same material with the same prerequisites as ME 3210, but in two 2 QH courses. *Prereq.* Admission to the Graduate School of Engineering.
- ME 3212 Essentials of Fluid Dynamics 2** 2 QH
As Announced
Continues ME 3211. *Prereq.* ME 3211.
- ME 3250 Advanced Physical Metallurgy 1** 2 QH
Fall Quarter, Odd Years
Examines dislocation theory, including such topics as dislocation stress fields, self-energy, velocity, interaction mechanisms, image forces, and theories of yielding. *Prereq.* A recent introductory materials science course.
- ME 3251 Advanced Physical Metallurgy 2** 2 QH
Winter Quarter, Odd Years
Studies mechanical behavior of composites. Covers application of dislocation theory to micro-plasticity, strain hardening, strengthening mechanisms, and creep. *Prereq.* ME 3250.
- ME 3252 Advanced Physical Metallurgy** 4 QH
Embodies the material in ME 3250 and ME 3251. *Prereq.* A recent introductory materials science course.
- ME 3260 Thermodynamics of Materials 1** 2 QH
Fall Quarter, Odd Years
Presents basic metallurgical thermodynamics encompassing first, second, and third laws, entropy, enthalpy, and free energy. *Prereq.* Engineering materials.
- ME 3261 Thermodynamics of Materials 2** 2 QH
Winter Quarter, Odd Years
Continues ME 3260, emphasizing solutions, activity, equilibrium coefficients, the phase rule, and applications to some metallurgical problems. *Prereq.* ME 3260.
- ME 3264 Thermodynamics of Materials** 4 QH
Embodies the material in ME 3260 and ME 3261. *Prereq.* Engineering materials.
- ME 3270 Materials Science and Engineering 1** 2 QH
As Announced
Explores the principles underlying the structure and properties of solid materials. Considers the relationships of these principles to the properties and to applications in structures and devices. Uses both macroscopic-phenomenological and electronic-molecular approaches. Includes metals, alloys, semiconductors, and dielectrics. Topics may include atomic and electronic structures, ordering, nucleation, crystal growth, and thermal properties. *Prereq.* A recent introductory materials science course.
- ME 3271 Materials Science and Engineering 2** 2 QH
As Announced
Continues ME 3270. Considers topics such as electric, magnetic, and optical properties; applications of solid-state phenomena to achieve functions embodied in transducers, filters, amplifiers, energy converters, and so forth. *Prereq.* ME 3270.
- ME 3272 Materials Science and Engineering** 4 QH
Fall Quarter
Embodies the material in ME 3270 and ME 3271. *Prereq.* A recent introductory materials science course.
- ME 3341 Power Generating Systems 1** 2 QH
As Announced
Examines power generating systems that employ fossil, nuclear, and heat recovery boilers operating in conjunction with steam and organic Rankine cycles. Studies the steady-state and transient operation of each power-generating system from both an analytical and conceptual point of view. Presents the effect that site conditions, fuel quality, plant loadings schedule, and environmental regulations have on system design, performance, and operation. *Prereq.* ME 3200 or equiv., or may be taken concurrently with permission of instructor.
- ME 3342 Power Generating Systems 2** 2 QH
As Announced
Continues ME 3341. Examines systems incorporating gas, hydraulic, and wind turbines, solar and fuel cells, energy storage, combined cycles, and cogenerating systems. Aims to develop, in conjunction with ME 3341, the skills needed to conduct sound technical evaluations of the power generating systems being built today. *Prereq.* ME 3341.
- ME 3343 Power Generation Economics and Planning** 2 QH
As Announced
Examines current and constant-dollar power generation costs. Considers life-cycle economic analysis, such as revenue requirements, discounted cash flow, internal rate of return, and payback analyses. Presents the planning methodologies used by electric utilities and private industry to evaluate and select power generating systems. *Prereq.* ME 3342.
- ME 3351 Solar Thermal Engineering 1** 2 QH
As Announced
Develops a model for the hourly direct and diffuse radiation under a cover of scattered clouds and the transmission and absorption of this radiation by passive and active systems. Considers the design of air heating systems, and the storage of the collected energy by a pebble-bed, as well as elements of heat exchanger design. Studies the economics of a domestic water and/or space heating system using f-chart analysis. *Prereq.* CHE 3660 or equiv.
- ME 3352 Solar Thermal Engineering 2** 2 QH
As Announced
Considers design and analysis issues of several solar thermal systems, such as LiBr-H₂O absorption cooling units, heat pumps, compound parabolic collectors, and the heat pipe type of solar collector. *Prereq.* ME 3351.
- ME 3360 Turbomachinery Design** 4 QH
Fall Quarter
Presents preliminary design methods and analytical tools applicable to turbomachinery. Discusses design criteria and performance characteristics at design and off-design operating conditions for several important

types of turbomachinery. Studies axial flow compressors and turbines (gas and steam) in depth, including topics such as compressor surge, turbine blade cooling, steam wetness effects, centrifugal compressors, radial inflow turbine, pumps, fans, and water turbines. Examines turbomachinery mechanical design limitations, the use of empirical data on blade cascade performance in blade selection, and numerical methods of analyzing two- and three-dimensional flows in turbomachinery (for example, conformal transformation and streamline curvature). Two in-depth design projects are assigned. This material is also covered in the two 2 QH courses, ME 3361 and ME 3362. *Prereq. Admission to the Graduate School of Engineering, including undergraduate preparation in fluid mechanics and thermodynamics.*

ME 3361 Turbomachinery Design 1 2 QH
As Announced

ME 3361 and ME 3362 present the same material contained in ME 3360, but in two 2 QH courses. *Prereq. Admission to the Graduate School of Engineering, including undergraduate preparation in fluid mechanics and thermodynamics.*

ME 3362 Turbomachinery Design 2 2 QH
As Announced

Continues ME 3361. *Prereq. ME 3361.*

ME 3370 Fundamentals of Maintenance in Design 4 QH
Spring Quarter, Odd Years

Covers basic tools of probability analysis. Presents failure modes and actual functional behavior of designed components in the probability forms, and age reliability. Offers nondescriptive evaluation techniques and demonstration tests. Explores fault tree analysis and decision logic. *Prereq. Admission to the Graduate School of Engineering.*

ME 3380 Fundamentals of Instrumentation 2 QH
Fall Quarter

Discusses the theoretical principles underlying the design and operation of instruments for measurement and/or control. Analyzes stimulus-response relations, and covers industrial instruments for measurement and control, including those based on pneumatic and electrical systems. *Prereq. BS degree.*

ME 3381 Industrial Process Control 2 QH
Winter Quarter

Introduces fundamental principles involved in automatic control of industrial processes. Considers economics, and the application of control instruments to obtain automatic control of temperature, pressure, fluid flow, liquid level, humidity, and PH. *Prereq. ME 3380.*

ME 3386 Nuclear Engineering 1 2 QH
As Announced

Studies the growth of the nuclear power industry; nuclear physics, emphasizing atomic and nuclear structure, radioactive decay, and nuclear reactions with particular attention to fission and fusion. Examines radiation health physics, principles of shielding, nuclear instrumentation; production and application

of radioisotopes, neutron interactions and slowing down theory, and neutron activation analysis. *Not open to students who have completed ME 1541 and ME 1542. Prereq. Admission to the Graduate School of Engineering.*

ME 3387 Nuclear Engineering 2 2 QH
As Announced

Compares thermal, fast, and breeder reactors. Explores four factor formula and the neutron diffusion equation; one-group, modified one-group, two-group and multi-group theory; bare and reflected thermal reactors; energy production and distribution within core; and flux shaping. Topics include transient reactor behavior and control; factors affecting reactivity including temperature, pressure, void formation, fission product accumulation, fuel depletion and fuel breeding; and Xenon buildup after shutdown. *Not open to students who have completed ME 1541 and ME 1542. Prereq. ME 3386.*

ME 3388 Nuclear Engineering 3 2 QH
As Announced

Presents reactor design considerations, and the inter-relationship of reactor physics, control, engineering, materials, safety, and fuel cycle management. Topics include reactor types, radiation damage and reactor materials, nuclear fuels, reactor heat transfer, economics of nuclear power, and environmental effects. *Not open to students who have completed ME 1541 and ME 1542. Prereq. ME 3387.*

ME 3400 Advanced Math Methods for Mechanical Engineers 4 QH
Fall Quarter

Embodies the material in ME 3401 and 3402. *Prereq. ME 3100.*

ME 3401 Advanced Math Methods for Mechanical Engineers 1 2 QH
As Announced

Studies matrices and linear equations, variational calculus and applications, approximate methods of engineering analysis, and selected topics of current interest. *Prereq. ME 3101 and ME 3102.*

ME 3402 Advanced Math Methods for Mechanical Engineers 2 2 QH
As Announced

Discusses integral transforms, asymptotic expansion, and regular and singular perturbation methods. Draws examples from solid mechanics, vibration, and fluid mechanics. *Prereq. ME 3101 and ME 3102.*

ME 3410 Numerical Methods in Mechanical Engineering 4 QH
Winter Quarter

Presents numerical methods applied to problems in mechanical engineering. Considers solution of linear and nonlinear systems of equations, interpolation, numerical differentiation and integration, and numerical solution of ordinary differential equations. Includes explicit and implicit methods, multistep methods, and predictor-corrector methods. Studies numerical solution of partial differential equations

with emphasis on parabolic and elliptic problems occurring in mechanical engineering. This material is also covered in the two 2 QH courses ME 3411 and ME 3412. *Prereq.* ME 3100.

ME 3411 Numerical Methods in Mechanical Engineering 1 2 QH
As Announced

ME 3411 and ME 3412 present the same material with the same prerequisites as ME 3410, but in two 2 QH courses.

ME 3412 Numerical Methods in Mechanical Engineering 2 2 QH
As Announced
Continues ME 3411. *Prereq.* ME 3411.

ME 3420 Mechanics of Inelastic Solids 4 QH
As Announced

Studies constitutive relations governing inelastic solids, including yield surface, plastic stress-strain relations, and Prandtl-Reuss equations. Examines viscoelastic stress-strain relations, the Maxwell and Voigt models, as well as viscoplasticity. *Prereq.* ME 3122. Not available to students who have taken ME 3421.

ME 3421 Introduction to Plasticity 2 QH
Winter Quarter, Even Years
Presents basic experimental information. Reviews stress and strain tensors, elastic stress-strain relations, yield surface, plastic stress-strain relations, Prandtl-Reuss equations, and simple applications. *Prereq.* ME 3121.

ME 3423 Theory of Elasticity 3 2 QH
Spring Quarter
Discusses approximate solutions for stress and displacement distributions in elastic solids, and discrete solutions using finite difference and finite element methods. Covers energy principles and the calculus of variations, and the use of energy principles to obtain approximate continuous solutions. *Prereq.* ME 3122.

ME 3431 Engineering Fracture Mechanics 4 QH
Fall Quarter, Odd Years
Embodies the material in ME 3432 and ME 3433. *Prereq.* ME 3120.

ME 3432 Engineering Fracture Mechanics 1 2 QH
As Announced
Examines the fundamentals of brittle fracture, theoretical strength, micro/macro fracture characteristic, Inglis-Griffith theory, and applicability. Topics include linear elastic fracture mechanics; Orowan/Irwin extension to metals, effective surface tension, and relation to fracture toughness; plastic zone size correction; geometry effects on fracture toughness; and plane strain/plane stress fracture toughness, and thickness effects. *Prereq.* ME 3122.

ME 3433 Engineering Fracture Mechanics 2 2 QH
As Announced
Focuses on experimental determination of fracture toughness, slow crack growth "pop in," arrest, R-G curves, and compliance techniques for determining elastic energy release rate. Considers alternate frac-

ture toughness concepts, including resistance curve, crack opening displacement, and the J integral. Studies the application of fracture mechanics to fatigue, and emphasizes design methods to minimize risks of catastrophic failure. *Prereq.* ME 3432.

ME 3434 Engineering Factors Mechanics 3 2 QH
As Announced

Studies application of fracture mechanics to fatigue, strain energy density criteria for fracture, arrest criteria, and includes a "Work of Fracture" specimen. Considers the application of fracture mechanics to structural analysis, and the effect of anisotropy in fracture mechanics. Examines fracture dynamics, dynamic fracture toughness, strain rate effects, microsecond fracture phenomenon and criteria, spall, Butcher-Tuler criterion, and NAG model. Emphasizes the residual strength and design approaches. *Prereq.* ME 3433.

ME 3440 Advanced Mechanics of Materials 4 QH
Winter Quarter
Embodies the material in ME 3441 and ME 3442. *Prereq.* Admission to the Graduate School of Engineering.

ME 3441 Advanced Mechanics of Materials 1 2 QH
As Announced
Reviews fundamental stress and deformation concepts, and strain energy density. Introduces energy methods with application to beams, frames and rings. Discusses the Ritz method. *Prereq.* Admission to the Graduate School of Engineering.

ME 3442 Advanced Mechanics of Materials 2 2 QH
As Announced
Investigates beams on elastic foundations and the concept of stability as applied to one and two degree-of-freedom systems. Topics include buckling of bars, frames, and rings. *Prereq.* ME 3441.

ME 3443 Advanced Mechanics of Materials 3 2 QH
As Announced
Offers selected topics in advanced mechanics. *Prereq.* ME 3442 or permission of instructor.

ME 3446 Theory of Shells 2 QH
Spring Quarter, Odd Years
Studies membrane theory of shells, analyzes cylindrical shells, and examines the general theory of thin elastic shells and shells of revolution. *Prereq.* ME 3122.

ME 3455 Mechanics of Composite Materials 2 QH
Winter Quarter, Odd Years
Focuses on constitutive equations for anisotropic laminated composite materials, and application to the structural response of beams and plates. Discusses bending and buckling of symmetric and nonsymmetric laminates. *Prereq.* ME 3121.

ME 3464 Automatic Control Engineering 4 QH
Fall Quarter, Even Years
Embodies the material in ME 3466 and ME 3467. *Prereq.* ME 3140.

ME 3466 Automatic Control Engineering 1 2 QH
As Announced

Studies control action, and the analysis and design by use of root-locus and frequency-domain techniques. *Prereq.* *Permission of instructor.*

ME 3467 Automatic Control Engineering 2 2 QH
As Announced

Offers further consideration of linear systems including compensation methods and multiple-input, and the techniques for the treatment of nonlinear systems. *Prereq.* *ME 3466.*

ME 3468 Robot Mechanics and Control 4 QH
Fall Quarter

Focuses on kinematics and dynamics of robot manipulators. Covers the development of kinematic equations of manipulators, the inverse kinematic problems, and motion trajectories. Explores the dynamics of manipulators for the purpose of control, employing Lagrangian mechanics, and considers the control and programming of robot manipulators. Discusses steady state errors and calculations of servo parameters, as well as high-level programming languages. *Prereq.* *ME 3142.*

ME 3470 Vibration Theory and Applications 4 QH
Spring Quarter

Embodies the material in ME 3472 and ME 3473. *Prereq.* *ME 3142 or ME 3471.*

ME 3472 Vibration Theory and Applications 1 2 QH
As Announced

Investigates Laplace transformation techniques, phase-plane diagrams, multiple-degree-of-freedom systems, and free and forced vibrations with and without damping. *Prereq.* *ME 3471, ME 3142, or permission of instructor.*

ME 3473 Vibration Theory and Applications 2 2 QH
As Announced

Presents systems with distributed mass and stiffness, extensional, torsional, and flexural vibrations of bars. *Prereq.* *ME 3472.*

ME 3474 Vibration Theory and Applications 3 2 QH
As Announced

Offers selected topics of current interest in vibrations. *Prereq.* *ME 3473.*

ME 3475 Random Vibration 2 QH
Fall Quarter, Odd Years

Presents a description of stochastic processes, and explores the impulse response and frequency response of linear time-invariant dynamic systems. Examines correlations and spectra of stationary response, crossing rates, peaks, and envelopes. Topics include failure under random loading; poisson pulse processes; measurement, identification, and response problems; coherence; space-time correlations and cross-spectra; digital data processing; and applications to vehicles and structures subjected to wide-band excitation. *Prereq.* *ME 3473.*

ME 3480 The Finite Element Method 4 QH
Spring Quarter

Embodies the material in ME 3481 and ME 3482. *Prereq.* *ME 3101 and ME 3102 or permission of instructor.*

ME 3481 Finite Element Analysis 2 QH
As Announced

Introduces the finite element method, including variational formulations, simple interpolation functions, and element stiffness matrices. Discusses triangular and rectangular elements, assembly technique and constraining of resulting equations, and elementary applications. *Prereq.* *ME 3101 and ME 3102 or permission of the instructor.*

ME 3482 Advanced Finite Element Method 1 2 QH
As Announced

Examines isoparametric element formulation of higher-order and three-dimensional elements. Studies the Rayleigh-Ritz and Galerkin formulations. Considers applications of finite element theory to mechanical engineering problems in the areas of solid mechanics, heat transfer, and fluid mechanics. Reviews the use of a finite element general purpose commercial package. *Prereq.* *ME 3481.*

ME 3483 Advanced Finite Element Method 2 2 QH
Fall Quarter, Even Years

Explores the dynamic finite element formulation with explicit and implicit time integration schemes for transient analysis. Studies solution methods for finite element equilibrium equations, including material and geometrical nonlinearities. Presents the general structure of computer procedures and codes, the influence of computer-aided design technology, and the use of an in-house general purpose commercial code. *Prereq.* *ME 3482.*

ME 3500 Computer-Aided Graphics and Design 4 QH
Winter Quarter

Covers the basic aspects of interactive computer graphics. Topics include hardware and software concepts, design principles for the user-computer interface, geometrical transformation, display architecture, and data structures. Studies algorithms for removing hidden edges and surfaces, shading models, and intensity and colors. Considers the concepts of computational and numerical geometry and design of curves and surfaces. Examines solid modeling techniques, and discusses in-house computer-aided graphics and design packages. *Prereq.* *Admission to the Graduate School of Engineering and programming experience.*

ME 3520 Experimental Techniques in Design 4 QH
Winter Quarter

Focuses on state of the art experimental techniques and their application in the design process. Topics include mechanical testing, vibration, thermofluids measurements, nondestructive evaluation, analog/digital data acquisition, and computer processing of experimental data. *Prereq.* *Admission to the Graduate School of Engineering.*

ME 3525 Manufacturing Methods for Engineers 4 QH**Spring Quarter**

Concentrates on manufacturing methods and their effects on the design, performance, and economy of engineering products. Discusses traditional material removing, forming, and joining processes and newly developed methods for producing and processing high-performance and specialty materials such as composites, superalloys, and electronic materials. Also covers fundamentals of nondestructive material testing, automated manufacture, and computer-aided design (CAD) and manufacturing (CAM). Emphasizes case studies related to complex manufacturing problems. *Prereq.* Admission to the Graduate School of Engineering.

ME 3540 Heat Conduction and Thermal Radiation 4 QH**Winter Quarter**

Studies the formulation of steady and unsteady state one- and multidimensional heat conduction problems. Examines solution techniques for linear problems including the method of separation of variables, Laplace transforms, and integral transforms. Discusses approximate analytical methods, phase change problems, nonlinear problems, the nature of thermal radiation, blackbody, and radiation from a blackbody. Presents radiation from a nonblack surface element, and radiative exchange among surfaces separated by a nonparticipating medium. Investigates the interaction of radiation with other modes of heat transfer in nonparticipating media. Numerical techniques in heat transfer are covered in ME 3410. This material is also covered in the two 2 QH courses ME 3541 and ME 3542. *Prereq.* ME 3100 and undergraduate course in heat transfer.

ME 3541 Heat Conduction and Thermal Radiation 1 2 QH**As Announced**

ME 3541 and ME 3542 present the same material with same prerequisites as ME 3540, but in two 2 QH courses.

ME 3542 Heat Conduction and Thermal Radiation 2 2 QH**As Announced**

Continues ME 3541. *Prereq.* ME 3541.

ME 3544 Convective Heat Transfer 4 QH**Fall Quarter**

Studies fundamental equations of convective heat transfer, heat transfer in incompressible external laminar boundary layers, and integral boundary layer equations. Examines laminar forced convection in internal flows, and turbulent forced convection in internal and external flows. Draws analogies between heat and momentum transfer, including the Reynolds, Taylor, and Martinelli analogies. Topics include natural convection, heat transfer in high-speed flow, transient forced convection, and convection and radiation in nonparticipating media. This material is also covered in the two 2 QH courses ME 3545 and ME 3546. *Prereq.* ME 3100, ME 3210, and undergraduate course in heat transfer.

ME 3545 Convective Heat Transfer 1 2 QH**As Announced**

ME 3545 and ME 3546 present the same material with the same prerequisites as ME 3544, but in two 2 QH courses.

ME 3546 Convective Heat Transfer 2 2 QH**As Announced**

Continues ME 3545. *Prereq.* ME 3545.

ME 3548 Radiative Transfer 4 QH**Spring Quarter, Even Years**

Examines electromagnetic background, and the fundamentals of radiation in absorbing, emitting, and scattering media. Studies the equation of radiative transfer, approximate methods in the solution of the equation of radiative transfer, and singular-eigenfunction expansion technique. Discusses pure radiative transfer in participating media, interaction of radiation with conduction and/or convection, and the Monte Carlo technique. This material is also covered in the two 2 QH courses ME 3549 and ME 3550. *Prereq.* ME 3540.

ME 3549 Radiative Transfer 1 2 QH**As Announced**

ME 3549 and ME 3550 present the same material with the same prerequisites as ME 3548, but in two 2 QH courses.

ME 3550 Radiative Transfer 2 2 QH**As Announced**

Continues ME 3549. *Prereq.* ME 3549.

ME 3552 Two Phase Flow 4 QH**Winter Quarter, Even Years**

Studies the basic concepts of heat and mass transfer associated with phase change and multiphase flows. Discusses boiling heat transfer (nucleate boiling, film boiling and bubble dynamics); evaporation and condensation; liquid-gas two phase flow and gas-solid and liquid-solid two phase flows. This material is also covered in the two 2 QH courses ME 3553 and ME 3554. *Prereq.* ME 3100 (or equiv.) and undergraduate course in heat transfer.

ME 3553 Two Phase Flow 1 2 QH**As Announced**

ME 3553 and ME 3554 present the same material as ME 3552 with the same prerequisites, but in two 2 QH courses.

ME 3554 Two Phase Flow 2 2 QH**As Announced**

Continues ME 3553. *Prereq.* ME 3553.

ME 3556 Heat Transfer Processes in 4 QH**Microelectronic Devices****Spring Quarter**

Discusses and develops state of the art methods used to predict the heat transfer rates from microelectronic devices and packages and to simulate transport phenomena in manufacturing processes associated with microelectronic devices. Topics, selected from the current literature, may include use of latent heat

reservoirs, boiling jet impingement cooling, control volume approaches to extended surfaces, and calculation of thermal contact conductances and natural convection in enclosures. Develops simulation of laser-assisted thermophoretic deposition and laser cladding processes. This material is also contained in the two 2 QH courses ME 3557 and ME 3558. *Prereq. ME 3100 (or equiv.) and undergraduate course in heat transfer or permission of instructor.*

ME 3557 Heat Transfer Processes in Microelectronic Devices 1 2 QH
As Announced

ME 3557 and ME 3558 provide the same material as ME 3556 with the same prerequisites, but in two 2 QH courses.

ME 3558 Heat Transfer Processes in Microelectronic Devices 2 2 QH
As Announced
Continues ME 3557. *Prereq. ME 3557.*

ME 3560 Viscous Flow 4 QH
Winter Quarter, Odd Years

Reviews conservation of mass, momentum, and energy for compressible viscous flow. Discusses the mathematical character of the basic equations and analysis of some exact solutions. Investigates low Reynolds number flow, exact and approximate approaches to laminar boundary layers in high Reynolds number flows, and stability of laminar flows and the transition to turbulence. Considers incompressible turbulent mean flow, internal and external flows, and extensions to compressible boundary layers. This material is also covered in the two 2 QH courses ME 3561 and ME 3562. *Prereq. ME 3100 and ME 3210.*

ME 3561 Viscous Flow 1 2 QH
As Announced
ME 3561 and ME 3562 present the same material with the same prerequisites as ME 3560, but in two 2 QH courses.

ME 3562 Viscous Flow 2 2 QH
As Announced
Continues ME 3561. *Prereq. ME 3561.*

ME 3564 Gas Dynamics 4 QH
Spring Quarter, Odd Years
Studies the consequences of fluid compressibility. Discusses shock waves and the theory of characteristics, focusing on two-dimensional steady flows and one-dimensional unsteady flows. Topics may include axially symmetric steady flow, small perturbation theory, similarity rules, the hodograph method, or some aspects of physical acoustics. This material is also contained in the two 2 QH courses ME 3565 and ME 3566. *Prereq. ME 3210.*

ME 3565 Gas Dynamics 1 2 QH
As Announced
ME 3565 and ME 3566 present the same material with the same prerequisites as ME 3564, but in two 2 QH courses. *Prereq. ME 3210.*

ME 3566 Gas Dynamics 2 2 QH
As Announced
Continues ME 3565. *Prereq. ME 3565.*

ME 3568 Computational Fluid Dynamics with Heat Transfer 4 QH
Spring Quarter

Examines finite difference methods for solving partial differential equations with particular emphasis on the equations of fluid dynamics and convective heat transfer. Discusses integral methods for boundary layers and their coupling to potential flow solutions. Considers the use of coordinate transformations and body-oriented coordinate systems. Presents the application of superposition techniques in convective heat transfer problems. This material is also covered in the two 2 QH courses ME 3569 and ME 3570. *Prereq. ME 3210 and ME 3410.*

ME 3569 Computational Fluid Dynamics with Heat Transfer 1 2 QH
As Announced

ME 3569 and ME 3570 present the same material with the same prerequisites as ME 3568, but in two 2 QH courses.

ME 3570 Computational Fluid Dynamics with Heat Transfer 2 2 QH
As Announced
Continues ME 3569. *Prereq. ME 3569.*

ME 3572 Aerosol Mechanics 4 QH
As Announced

Studies the behavior of ultrafine particles from both microscopic and macroscopic viewpoints. Discusses the microscopic origins of aerosol transport phenomena including Brownian diffusion, drag, thermopresis, condensation, and evaporation. Examines deposition processes for monodisperse aerosols including distribution function for polydisperse aerosols, the general dynamic equation and methods of solution, homogeneous nucleation, and coagulation. Introduces industrial applications. *Prereq. ME 3100, ME 3200, ME 3210, or permission of instructor.*

ME 3580 Statistical Thermodynamics 4 QH
Spring Quarter, Even Years

Introduces mechanical engineers to statistical thermodynamics, providing insight into the laws of classical thermodynamics and the behavior of substances. Topics include: introduction to probability; elementary kinetic theory of an ideal gas, including the distribution of molecular velocities and the mean free path treatment of transport properties; classical statistics of independent particles, equipartition of energy, the partition function and laws of thermodynamics; some results from quantum mechanics, quantum statistics of independent particles; applications to gases; introduction to ensembles and systems of interacting particles. This material is also contained in the two 2 QH courses ME 3581 and ME 3582. *Prereq. ME 3100 and ME 3200 or equiv.*

ME 3581 Statistical Thermodynamics 1 2 QH
As Announced

ME 3581 and ME 3582 present the same material with the same prerequisites as ME 3580, but in two 2 QH courses.

ME 3582 Statistical Thermodynamics 2 2 QH
As Announced

Continues ME 3581. *Prereq.* ME 3581.

ME 3584 Fundamentals of Combustion 4 QH
Fall Quarter, Even Years

Offers comprehensive treatment of the problems involved in the combustion of liquid, gaseous, and solid fuels in both laminar and turbulent flow. Discusses the fundamentals of chemical kinetics, and examines the equations for the transport of mass, momentum, and energy with chemically reacting gases. Topics include diffusion and premixed flames, combustion of droplets and sprays, and gasification and combustion of coal. This material is also presented in the two 2 QH courses ME 3585 and ME 3586. *Prereq.* ME 3200.

ME 3585 Fundamentals of Combustion 1 2 QH
As Announced

ME 3585 and ME 3586 present the same material as ME 3584, with same prerequisites, but in two 2 QH courses.

ME 3586 Fundamentals of Combustion 2 2 QH
As Announced

Continues ME 3585. *Prereq.* ME 3585.

ME 3600 Advanced Physical Metallurgy 3 2 QH
Spring Quarter, Odd Years

Studies the kinetics of phase transformations in metals. Topics include kinetic theory, empirical kinetics, diffusion in metals, nucleation, diffusional growth, and martensitic transformations. *Prereq.* A recent introductory materials science course.

ME 3601 Thermodynamics of Materials 3 2 QH
Spring Quarter, Odd Years

Examines the application of metallurgical thermodynamics to various process metallurgical problems, such as gas-solid systems, plus kinetics of reactions, and dynamic systems analysis. *Prereq.* ME 3260 or ME 3261.

ME 3602 Materials Science and Engineering 3 2 QH
As Announced

Continues ME 3271 with a discussion of various special topics that will vary from year to year. For example metastable phases and thin films. *Prereq.* ME 3271.

ME 3603 Corrosion 2 QH
As Announced

Studies the thermodynamics of corrosion and corrosion reactions both in aqueous and non-aqueous environments. Topics include thermodynamics, kinetics, and the effects of environment and physical metallurgy. Considers applications to automotive design, and exterior and interior structures. *Prereq.* Admission to the Graduate School of Engineering.

ME 3604 Oxidation 2 QH
As Announced

Examines the thermodynamics of oxidation and the effect of environment on rates of oxidation. Topics include thermodynamics, kinetics, mechanisms, and effect of environment. Assesses ferrous and nonferrous metals as well as polymers. *Prereq.* Admission to the Graduate School of Engineering.

ME 3605 Electronic Materials 1 2 QH
Fall Quarter, Odd Years

Presents generic techniques for fabrication and processing, and the resulting structure-property relationships, for materials utilized in electronics. Materials may include bulk single crystals, thin films, metals, semiconductors, and insulators. *Prereq.* ME 3271.

ME 3606 Electronic Materials 2 2 QH
Winter, Odd Years

Continues ME 3605. *Prereq.* ME 3605.

ME 3607 Electronic Materials 4 QH
As Announced

Embodies the material in ME 3605 and ME 3606. *Prereq.* A course in material science and engineering.

ME 3610 Introduction to Diffraction 2 QH
Methods in Material Science

As Announced

Studies the general principles of the diffraction by materials of short wave length radiations, such as X-ray, electrons, and thermal neutrons. Focuses on the similarities and differences of the different radiations when applied to the study of the structures of crystalline and noncrystalline materials. *Prereq.* A recent introductory materials science course.

ME 3611 Diffraction Methods in Material Science 2 QH
As Announced

Continues ME 3610, emphasizing experimental methods and applications. Topics include choice of radiation, introduction to instrumentation, sample preparation, methods of detection and recording of the diffracted radiation, and analysis, interpretation and use of the results. *Prereq.* ME 3610.

ME 3612 Microstructure Analysis 1 2 QH
Fall Quarter, Even Years

Discusses the principles of scanning and transmission electron microscopy, including image interpretation in transmission electron microscopy with an emphasis on the study of the relationships between microstructure and properties of materials. Considers application of kinematical and dynamical theories of electron diffraction to quantitative analyses of point defects, dislocations, precipitates, and grain boundaries. Includes laboratory demonstration of TEM and SEM operation. *Prereq.* Admission to the Graduate School of Engineering.

ME 3613 Microstructure Analysis 2 2 QH
Winter, Even Years

Continues ME 3612. *Prereq.* ME 3612.

ME 3620 Powder Metallurgy 2 QH
Spring Quarter, Even Years
 Studies powder characteristics and methods of manufacturing. Considers powder pressing, including packing, interparticle bonding, and effects of pressure. Discusses the principles of sintering, as well as the characteristics and properties of products made from powdered materials. *Prereq.* A recent introductory materials science course.

ME 3625 Physical Ceramics 1 2 QH
Fall Quarter, Even Years
 Introduces ceramic fabrication processes, including the characteristics of vitreous and crystalline solids, structural imperfections, and atomic mobility. Explores phase equilibria, nucleation, crystal growth, solid-state reactions, non-equilibrium phases, and effects on the resulting microstructure of ceramics. *Prereq.* A recent introductory materials science, physical chemistry, or solid state physics course.

ME 3626 Physical Ceramics 2 2 QH
Winter Quarter, Even Years
 Discusses the effects of composition and microstructure on the thermal, mechanical, optical, electrical, and magnetic properties of ceramic materials. *Prereq.* ME 3625.

ME 3630 The Structure and Properties of Polymeric Materials 1 2 QH
Fall Quarter, Even Years
 Introduces the organic chemistry of polymers, effect of chemical composition on structure, melting point and glass transition temperature, polymer characterization and degradation, and thermodynamics of polymers. *Prereq.* Undergraduate materials science course.

ME 3631 The Structure and Properties of Polymeric Materials 2 2 QH
Winter Quarter, Even Years
 Examines rheology and mechanical behavior of polymers, analysis and testing, effects of processing on structure and physical properties, industrial polymers, and resin base composites. *Prereq.* ME 3630.

ME 3640 Computer Modeling of Materials Processing 2 QH
As Announced
 Focuses on the use of numerical methods for modeling a variety of materials processes, for example, melting, oxidation, reduction, the blast furnace, the cupola, rolling, and extrusion. *Prereq.* Admission to the Graduate School of Engineering.

ME 3641 Computer Modeling of Materials Properties 2 QH
As Announced
 Uses various mathematical techniques and computer methods to develop models that describe the changes in a material's chemical, mechanical, and physical properties as the chemical composition and metallurgical variables are changed. *Prereq.* Admission to the Graduate School of Engineering.

ME 3797 Engineer Degree Continuation 0 QH
Any Quarter

ME 3798 Master's Degree Continuation 0 QH
Any Quarter

ME 3799 Doctoral Continuation 0 QH
Any Quarter

ME 3850 Special Problems in Mechanical Engineering 2 QH
Any Quarter
 Offers theoretical or experimental work under individual faculty supervision. *Prereq.* Permission of department faculty.

ME 3853 Special Topics in Mechanical Engineering 2 QH
Any Quarter
 Presents topics of interest to the staff member conducting this class for advanced study. *Prereq.* Permission of department faculty.

ME 3854 Special Topics in Mechanical Engineering 4 QH
Any Quarter
 Presents topics of interest to the staff member conducting this class for advanced study. *Prereq.* Permission of department faculty.

ME 3856 Doctoral Reading 2 QH
Any Quarter
 Studies material approved by the candidate's adviser (only S or F grades will be assigned for this course). *Prereq.* Passing of PhD qualifying exam.

ME 3860 Master's Thesis 6 QH
Any Quarter
 Includes analytical or experimental work conducted under the direction of the faculty in fulfillment of the requirements for the degree. First-year students must attend a graduate seminar program that will introduce the students to the methods of choosing a research topic, conducting research, and preparing a thesis. Successful completion of the seminar program is required. *Prereq.* Admission to the Graduate School of Engineering.

ME 3861 Master's Thesis 4 QH
Any Quarter
 Same as ME 3860.

ME 3862 Master's Thesis 2 QH
Any Quarter
 Same as ME 3860.

ME 3870 Mechanical Engineer's Thesis 0 QH
Any Quarter
 Offers analytical and/or experimental work conducted under the auspices of the department. *Open to day students only.* *Prereq.* Admission to the Mechanical Engineer Degree Program.

ME 3871 Mechanical Engineer's Thesis 4 QH
Any Quarter
 Offers analytical or experimental work conducted under the auspices of the department. *Open to day students only.* *Prereq.* Admission to the Mechanical Engineer Degree Program.

ME 3872 Mechanical Engineer's Thesis **2 QH**
Any Quarter
Same as ME 3872.

ME 3880 Doctoral Dissertation **0 QH**
Any Quarter
Presents theoretical and experimental work conducted under the supervision of the department. *Open to day students only. Prereq. Admission to the Doctoral Program in Mechanical Engineering.*

Graduate School of Nursing

Core courses in the Graduate School of Nursing are as follows.

NUR 3101 Theoretical Foundations of Nursing 3 QH
Analyzes the development of the art and science of nursing. Includes systematic examination of major nursing theories and conceptual frameworks, elements of theory building, and theoretical frameworks from disciplines relevant to advanced nursing practice.

NUR 3102 Professional Issues in Nursing 3 QH
Addresses concepts basic to understanding the criteria for professionalism. Emphasizes ethical, legal, political, and economic issues that affect the individual practitioner, the profession, the client system, and the health care delivery system.

NUR 3103 Research Methods in Nursing 3 QH
Focuses on the relationship of research to knowledge and advanced nursing practice. Emphasizes the scientific process, formulating research problems, study designs, measuring variables, collecting data, and testing hypothesis. Requires students to develop preliminary research proposals. *Prereq.* Undergraduate statistics course that includes probability and hypothesis testing.

NUR 3104 Administrative Aspects of Nursing 3 QH
Emphasizes developing knowledge and skill in using theory to analyze organizational issues and roles in professional nursing. Focuses on organizational structure and process in relation to nursing service and health care delivery from various perspectives.

NUR 3105 Research Seminar 2 QH
Examines the essentials of research projects. Includes implementing survey methods, reliability and validity of norm-referenced and criterion-referenced measures, statistical applications, techniques in scaling, and data analysis. Provides opportunities for computer data processing and analysis and use of SPSS-X software. Requires the student to develop a research proposal. *Prereq.* NUR 3103.

NUR 3106 Advanced Pathophysiology 3 QH
Emphasizes complex pathophysiological concepts essential to the care of individuals with life-threatening

illness. Includes review of cellular physiology; physiologic dysfunction; physiologic adaptation to maintain the internal environment; and feedback and control mechanisms at the cellular, organ, and system levels of physiological functioning.

NUR 3107 Advanced Pharmacology 2 QH
Focuses on principles of pharmacology and the major drug classifications in relation to the treatment of health problems. Examines the effects of selected medications on pathophysiology and psychopathology.

NUR 3140 Curriculum Development in Nursing 3 QH
Focuses on curriculum development in nursing education. Includes history of nursing education, learning theories, criteria for programs in higher education, curriculum designs, testing and evaluation methods. Examines values, trends, and issues in contemporary nursing education.

NUR 3141 Teaching by Guided Design 3 QH
Provides experience in planning, implementing, and evaluating a teaching strategy in nursing education. Requires students to collaborate with course instructors and students to develop a guided design project that is implemented and evaluated in a baccalaureate nursing program. Seminars focus on preparing guided design projects, implementing strategies, and evaluating appropriately. Requires student teaching in a concurrent baccalaureate nursing course.

NUR 3142 Teaching Practicum 3 QH
Provides an individualized experience in practice teaching in a clinical or educational setting. Emphasizes teaching strategies, methods of learning reinforcement, and evaluation of teaching effectiveness. Examines faculty role and responsibilities. Requires students to implement and evaluate a teaching project or course, with assistance from a faculty preceptor. *Prereq.* Concurrent with NUR 3140.

Community Health Nursing

NUR 3200 Theoretical Foundations of Health 3 QH
Focuses on health, its theoretical development, and the health-illness continuum. Includes epidemiology, biostatistics, demography, environmental health, occupational health, and international health. Introduces issues in public health policy.

NUR 3201 Theories of Health Behavior 3 QH
Focuses on health, illness, sickness, and disability from nursing, sociological, psychological, cultural, and medical perspectives. Examines concepts, theories, and models that explain health-related behaviors. Explores the empirical foundation of interventions designed to promote health and prevent disease in individuals living in the community.

NUR 3202 Theories of Family Health 3 QH
Investigates theoretical bases for family nursing practice. Includes selected family frameworks developed by nursing and other disciplines. Reviews and evaluates research studies of family health and their application to health care of families in the community.

NUR 3203 Theories of Community Health Nursing 4 QH
Examines theoretical bases for identification and analysis of factors that promote or inhibit community health. Focuses on the development of strategies to meet health problems, and the role of nursing in community health care. *Prereq.* Concurrent NUR 3200, NUR 3201, or NUR 3202.

NUR 3204 Public Policy and Health Services Delivery 3 QH
Focuses on relevant planning, regulatory, and economic policies. Considers application of policies to developing, implementing, and evaluating programs to meet the health care needs of high-risk populations.

NUR 3205 Decision Making in the Delivery of Home Health Services 3 QH

Concentrates on relevant theories and their application to the decision-making processes which are the foundation of home health service delivery. Examines organizational, fiscal, and human resource factors.

NUR 3206 Case Management in Home Health Care 3 QH
Addresses application of case management skills to various client developmental stages and health states. Includes reimbursement, legal, organizational, ethical, and research issues involved in providing home health care.

NUR 3211 Public Health Practicum 1 4 QH
Provides a clinical learning experience to test the theoretical bases for community health nursing practice with individuals, families, and communities. Includes an individually negotiated field placement related to public health nursing and a weekly didactic seminar with faculty. *Prereq. Concurrent with NUR 3203 or NUR 3204.*

NUR 3212 Home Health Care Administration Practicum 1 4 QH
Provides an administrative learning experience to test the theoretical bases for community health nursing practice. Involves negotiated field placement in a home health agency and a weekly didactic seminar with faculty. *Prereq. Concurrent with NUR 3203 or NUR 3205.*

NUR 3213 Home Health Clinical Practicum 1 4 QH
Provides a clinical learning experience to test the theoretical bases for community health nursing practice with individuals, families, and communities. Includes an individually negotiated field placement in a home health agency and a weekly didactic seminar with faculty. *Prereq. Concurrent with NUR 3203 or NUR 3206.*

NUR 3214 Public Health Practicum 2 4 QH
Provides a clinical learning experience integrating knowledge about role, management, organizational, and social behavior theories, and developing skills for advanced community health nursing practice. Includes a negotiated field placement related to public health and a weekly didactic seminar with faculty. *Prereq. NUR 3211.*

NUR 3215 Home Health Administration Practicum 2 4 QH
Provides a clinical learning experience integrating knowledge about role, management, organizational, and social behavior theories. Develops skills for advanced community health nursing practice. Involves a negotiated field placement related to home health care administration and a weekly didactic seminar with faculty. *Prereq. NUR 3212.*

NUR 3216 Home Health Clinical Practicum 2 4 QH
Provides a clinical learning experience integrating knowledge about role, management, organizational, and social behavior theories. Develops skills for advanced community health nursing practice. Involves a negotiated field placement related to home health care clinical specialty practice and a weekly didactic seminar with faculty. *Prereq. NUR 3213.*

NUR 3231 Research Advisement 2 QH
Focuses on implementing the research project or thesis on community health nursing with assistance from faculty research advisers. Requires data collection, analysis, and presentation of research findings. *Prereq. NUR 3105.*

NUR 3241 Community Health Directed Study 3 QH
Allows student to develop individualized plan to attain specific knowledge and skills related to professional goals. Consists of library study or reading, individual instruction, research, practicum, or other appropriate activity. *Prereq. Academic adviser's approval.*

Critical Care Nursing

NUR 3301 Critical Care Concepts 3 QH
Explores the analysis and application of core behavioral, environmental, and psychosocial concepts essential to nursing care of individuals with critical health problems. Emphasizes critical evaluation of current nursing theory and research for potential application of findings in clinical practice. Includes opportunities to explore and develop concepts unique to each student's concentration area.

NUR 3302 Nursing Management of the Critically Ill 4 QH
Emphasizes theoretical knowledge essential to understanding life-threatening pathophysiological problems, nursing diagnosis, and related management of critically ill individuals and their families. Includes current

theories and research from nursing, and physical and behavioral sciences as a basis for clinical decision making. Uses the frameworks of the nursing process and the lifecycle to present course content. *Prereq. NUR 3106 or equiv.*

NUR 3303 Nursing Management of the Critically Ill 2 3 QH
Continues the discussion of theories essential to understanding life-threatening pathophysiological problems, nursing diagnosis, and related management of the critically ill and their families. Includes current theories and research from nursing and physical and behavioral sciences as a basis for clinical decision making. Considers models of nursing care delivery and ethical and legal issues related to critical care. *Prereq. Concurrent with NUR 3107 or NUR 3302.*

NUR 3304 Role Development Seminar 3 QH
Explores the role of the clinical nurse specialist. Focuses on collaboration and change strategies in various practice settings. Includes consultation, education, liaison, supervision, peer review and referral. *Prereq.* Concurrent with NUR 3312.

NUR 3311 Critical Care Nursing Practicum 1 4 QH
Provides a clinical learning experience in a concentration area of critical care nursing. Utilizes a variety of clinical settings and skilled agency preceptors to meet students' individual learning needs. Includes a weekly didactic seminar with faculty. *Prereq.* Concurrent with NUR 3302.

NUR 3312 Critical Care Nursing Practicum 2 4 QH
Continues learning experience in an individually negotiated clinical setting. Utilizes the clinical, managerial, or teaching role of the clinical specialist in critical care nursing. Includes a weekly didactic seminar with faculty. *Prereq.* Concurrent NUR 3304 or NUR 3311.

NUR 3313 Critical Care Nursing Practicum 3 4 QH
Provides intensive clinical learning experience in a concentration area of critical care nursing. Focuses on implementing the student's chosen functional role. Includes a weekly didactic seminar with faculty. *Prereq.* NUR 3312.

NUR 3331 Research Advisement 2 QH
Focuses on implementing the research project or thesis on critical care nursing with assistance from faculty research advisers. Requires data collection, analysis, and presentation of research findings. *Prereq.* NUR 3105.

NUR 3341 Critical Care Directed Study 3 QH
Allows student to develop individualized plan to attain specific knowledge and skills related to professional goals. Consists of library study or reading, individual instruction, research, practicum, or other appropriate activity. *Prereq.* Academic adviser's approval.

Primary Care Nursing

NUR 3401 Primary Care of Well Children 3 QH
Focuses on assessing newborns, healthy children, and their families, and on issues pertinent to normal development. Includes a framework for anticipatory guidance and assessing development at various ages and stages of childhood; general guidelines for routine health care maintenance; screening, and immunizations; and discussion of common health problems encountered in a pediatric primary care setting. *Prereq.* Concurrent with NUR 3106.

NUR 3402 Primary Care of Child Health Problems 4 QH
Develops cognitive and affective competencies necessary for performing successfully as primary care nurses. Focuses on assessment, diagnosis and management of children with minor acute and stabilized chronic illnesses. Emphasizes the advanced nursing practice role and developing collaboration, consultation, and referral skills. *Prereq.* NUR 3401; concurrent NUR 3107.

NUR 3403 Primary Care of Well Adults 3 QH
Provides an overview of health promotion as an integral aspect of adult health within the primary care context. Includes the impact of ecological, psychological, sociological, and physiological factors on human health. Examines adult development as a framework to assess health needs and formulate intervention strategies for individuals and families. Reviews nursing issues related to integrating these techniques into the advanced practice role. *Prereq.* concurrent NUR 3106.

NUR 3404 Primary Care of Adult Health Problems 4 QH
Develops cognitive and affective competencies necessary for performing successfully as primary care nurses. Focuses on assessment, diagnosis and management of adults with minor acute and stabilized chronic illnesses. Emphasizes the advanced nursing practice

role and developing collaboration, consultation, and referral skills. *Prereq.* NUR 3403 concurrent NUR 3107.

NUR 3405 Primary Care of Adolescents/Young Adult Health Problems 4 QH
Builds on the cognitive and affective skills developed in NUR 3402 or NUR 3404. Focuses on common health problems of adolescents and young adults, emphasizing the reproductive system. Considers client's health risks and health behavior including cultural factors, health promotion, and application of individual, developmental, and family dynamic frameworks. Incorporates anatomy, physiology, pathophysiology and pharmacology. *Prereq.* NUR 3402 or NUR 3404.

NUR 3406 Primary Care of Well Older Adults 3 QH
Provides an overview of the normal aging process and physiology of older adults. Uses frameworks of healthy aging to assess health needs and formulate intervention strategies for older adults and families. Emphasizes health promotion and disease prevention. Reviews practice issues related to integrating these techniques into the advanced nursing practice role. *Prereq.* concurrent NUR 3106.

NUR 3407 Primary Care of Older Adult with Health Problems 1 4 QH
Discusses assessing, promoting, and maintaining health and function of the elderly in long-term care institutions. Includes advanced assessment techniques appropriate for the elderly; pathophysiology of aging; pathophysiology of acute and chronic disease; pharmacology; treatment of acute and chronic medical and psychiatric illness; counseling techniques, and strategies for evaluation and follow-up. Discusses quality assurance, interdisciplinary teaming, and current policies and trends affecting long-term health care. *Prereq.* NUR 3406 concurrent NUR 3107.

NUR 3408 Primary Care of Older Adult Health Problems 2 4 QH

Focuses on assessing, promoting, and maintaining health and function of the older adult with health problems living in the community. Emphasizes analysis of research relating to social support systems and individual psychological coping, with the goal of defining nursing interventions to improve functions and well-being of the elderly and their families. Addresses ethical dilemmas and the effect of cultural expectations on health care. *Prereq.* NUR 3407.

NUR 3409 Role Development Seminar 3 QH

Explores the role of the clinical nurse specialist and nurse practitioner. Focuses on using collaboration and change strategies in various practice settings. Includes consultation, education, liaison, supervision, peer review and referral. Students meet together for seminar and are assigned to integrated specialty groups to focus on issues related to advanced practice in nursing. *Prereq.* concurrent NUR 3402, NUR 3404 or NUR 3407.

Provides a clinical learning experience in primary care nursing with children in ambulatory settings that correlates with NUR 3401. Uses a holistic approach to assess the child and family. Emphasizes identification of families or individuals at risk for health problems, as well as health promotion and health maintenance. Involves an individually negotiated clinical placement with agency preceptors and a weekly didactic seminar with faculty. *Prereq.* Concurrent with NUR 3401.

NUR 3412 Primary Care of Children Practicum 2 4 QH

Provides a clinical learning experience emphasizing delivery and coordination of primary care nursing services for children and their families. Focuses on assessment, diagnosis and management of stable chronic conditions and episodic acute illnesses commonly encountered in children. Builds on a foundation of practice behaviors in health assessment, health promotion, and disease prevention. Involves an individually negotiated clinical placement with agency preceptors and a weekly didactic seminar with faculty. *Prereq.* Concurrent with NUR 3402 and NUR 3411.

NUR 3413 Primary Care of Adolescents/Young Adults Practicum 3 4 QH

Builds on clinical experience in NUR 3412 and NUR 3415. Provides experience in two clinical sites focusing on reproductive health care and adolescent/young adult health problems. Discusses women's health issues and adolescent problems. Explores developing and negotiating roles and relationships within the health care team. Includes a weekly didactic seminar. *Prereq.* Concurrent with NUR 3405, NUR 3412 or NUR 3415.

NUR 3414 Primary Care of Adults Practicum 1 3 QH

Provides a clinical learning experience in primary care nursing with adults in ambulatory settings. Uses a holistic approach to assess the adult and family. Emphasizes identification of individuals at risk for health problems, as well as health promotion and health maintenance. Involves an individually negotiated

clinical placement with agency preceptors and a weekly didactic seminar with faculty. *Prereq.* Concurrent with NUR 3403.

NUR 3415 Primary Care of Adults Practicum 2 4 QH

Provides a clinical learning experience which emphasizing delivery and coordination of primary care nursing services for adults and their families. Focuses on assessment, diagnosis and management of stable chronic conditions and episodic acute illnesses commonly encountered in adults. Builds on a foundation of practice behaviors in health assessment, health promotion and disease prevention. Involves an individually negotiated clinical placement with agency preceptors and a weekly didactic seminar with faculty. *Prereq.* Concurrent with NUR 3404 and NUR 3414.

NUR 3416 Primary Care of Adults Practicum 3 4 QH

Builds on the clinical learning experience of previous primary care nursing courses. Focuses on women's health and reproductive functions, as well as factors related to aging. Involves a weekly didactic seminar that examines problems related to women's health care and developmental changes associated with aging. *Prereq.* NUR 3415 and concurrent with NUR 3405.

NUR 3417 Primary Care of Older Adults Practicum 1 3 QH

Provides a clinical learning experience in primary care nursing with older adults in a variety of settings. Uses a holistic approach to assess the older adult and family. Emphasizes the identification of individuals and families at risk for health problems, as well as health promotion and maintenance. Involves an individually negotiated clinical placement with agency preceptors and a weekly didactic seminar with faculty. *Prereq.* NUR 3418 and concurrent with NUR 3406.

NUR 3418 Primary Care of Older Adults Practicum 2 4 QH

Provides a clinical learning experience in caring for older adults in long-term care facilities. Defines practice skills to optimize function, health, and well-being by managing health problems and supporting psychological coping skills in the elderly. Analyzes organizational behavior principles that affect the primary care nurse's role in advanced practice. Involves a weekly didactic seminar with faculty. *Prereq.* NUR 3417 or concurrent with NUR 3407.

NUR 3419 Primary Care of Older Adults Practicum 3 4 QH

Provides a clinical learning experience in caring for older adults in the community. Refines practice skills and emphasizes interventions in social support systems and psychological coping for the elderly. Addresses the primary care nurse's role in caring for impaired older adults living in the community. Involves a weekly didactic seminar with faculty. *Prereq.* NUR 3418 or concurrent with NUR 3408.

NUR 3420 Rural Health Care 4 QH

Provides a concentrated, individually negotiated, clinical learning experience in a rural health area for one month with supervision by an onsite preceptor. Focuses on assessing the community and developing a community health education program. Includes practice of

primary care nursing skills with individuals and families. Requires students to present their rural health experience in a seminar upon completion of the course. *Prereq.* *Permission of the instructor.*

NUR 3431 Research Advisement 2 QH
Focuses on implementing the research project or thesis on primary care nursing with assistance from faculty research advisers. Requires data collection, analysis, and presentation of research findings. *Prereq.* *NUR 3105.*

Psychiatric-Mental Health Nursing

NUR 3501 Human Behavior: Personality 3 QH
Focuses on the psychological structure, development, and functioning of the individual. Examines personality development as a progression of stages of growth facilitated or delayed by interpersonal and sociocultural factors. Explores basic theoretical concepts within various framework from the psychoanalytic to the feminist. Examines literature from other disciplines relevant to psychiatric nursing practice.

NUR 3502 Human Behavior: Family Systems 3 QH
Introduces family dynamics, therapy, and research. Focuses on psychodynamics of the family, interaction and communication process, family structure and organization, family dysfunction, and therapy practices. Uses family case studies and clinical media to demonstrate ways to observe, describe, analyze, and intervene in family-focused treatment situation. Reviews and evaluates research approaches to study of the family. *Prereq.* *NUR 3501 or equiv.*

NUR 3503 Dimensions of Community Mental Health 3 QH
Focuses on broad issues of community mental health, systems, and factors that influence services to diverse populations. Addresses the fundamentals of group process related to target populations in community mental health settings. Emphasizes interdisciplinary approaches to planning community services and designing prevention programs. Includes historical, political, economic, cultural, and professional issues relevant to the community mental health movement and the role of the psychiatric clinical nurse specialist in this area. *Prereq.* *NUR 3502 or equiv.*

NUR 3504 Psychopathology of Childhood 3 QH
Emphasizes psychopathological disorders throughout the developmental phases of infancy, early childhood, and latency. Focuses on diagnostic process and treatment planning for nursing intervention. Uses a psychoanalytic model primarily, but also discusses interactional, behavioral, and neurological models related to assessment, treatment, and prevention. Considers therapeutic work with parents. *Prereq.* *Concurrent with NUR 3501 or equiv.*

NUR 3505 Mental Health Problems of Adolescents 3 QH
Focuses on therapeutic management of adolescent health problems. Topics include assessment and adolescent suicide, self-destructive behavior, incest, drug

NUR 3441 Primary Care Directed Study 3 QH
Allows student to develop an individualized plan to attain specific knowledge and skills related to professional goals. Consists of library study or reading, individual instruction, research, practicum, or other appropriate activity. *Prereq.* *Academic adviser's approval.*

and alcohol abuse, acting-out behavior, psychosis, and violence. Explores psychodynamic concepts, psychiatric referral process, and issues related to treatment and placement in the community. *Prereq.* *NUR 3501 or equiv.*

NUR 3506 Role Development Seminar 3 QH
Explores the role of the clinical nurse specialist. Focuses on the use of collaboration and change strategies in various practice settings. Includes consultation, education, liaison, supervision, peer review, and referral. *Prereq.* *Concurrent with NUR 3503.*

NUR 3511 Psychiatric Nursing Practicum 1 4 QH
Provides clinical experiences with adults or children and adolescents in psychiatric settings. Investigates techniques of observing, communicating, and interviewing in assessing individuals. Surveys basic psychopathology, differential diagnosis, psychopharmacology, and treatment planning within various psychodynamic formulations in a weekly didactic seminar with faculty. Students develop a caseload of selected clients and practice two days per week in a negotiated placement with an agency preceptor. *Prereq.* *Concurrent with NUR 3501.*

NUR 3512 Psychiatric Nursing Practicum 2 4 QH
Provides clinical experiences with adults or children and adolescents in psychiatric settings. Focuses on planning care, psychiatric treatment modalities, and management issues. Explores therapeutic approaches pertinent to selected psychiatric disorders from the DSM-III-R, emergency intervention, and crisis intervention. Uses case material from students' continuing practice in agency as basis for discussion in weekly didactic seminar with faculty. *Prereq.* *NUR 3511 and concurrent with NUR 3502.*

NUR 3513 Psychiatric Nursing Practicum 3 4 QH
Provides clinical experiences with individuals, groups, and families in psychiatric and community settings. Focuses on direct and indirect care, with an increasing emphasis on community involvement in treating mental health problems. Requires assessing a particular community to identify a mental health problem and begin planning a community program. Discusses case studies, interdisciplinary collaboration issues, and intervention strategies from a community mental health perspective in the weekly didactic seminar with faculty. *Prereq.* *NUR 3512 and concurrent with NUR 3503.*

NUR 3514 Psychiatric Nursing Practicum 4 QH

Provides a clinical learning experience with groups, families, and organizations in psychiatric and community settings. Requires students to implement and evaluate a community project. Focuses on promotion of mental health and levels of prevention; synthesis of therapeutic techniques in working with complex systems; group process and termination issues related to work with clients, agency, professionals, faculty and student colleagues; and evaluation of clients' progress and students' accomplishments in weekly didactic seminar with faculty. *Prereq.* NUR 3513.

NUR 3520 Crisis Theory and Intervention 3 QH

Addresses crisis theory, practice, and research issues. Reviews and critiques crisis literature. Refines crisis intervention skills and stimulates theory and research development in the crisis intervention field. Includes lectures and discussion of crisis situations from the literature, personal and professional experience and films. Open to graduate students in nursing, criminal justice, applied sciences, and health professions.

NUR 3521 Alcoholism: Assessment and Early Intervention 3 QH

Explores theories and issues related to alcoholism and other addictions. Focuses on skills necessary to assess

addictive behavior including taking a client's drug history, working with denial, and making appropriate referrals. Assignments include taking a drinking/drug history and attending a self-help group in the community. Discusses therapeutic issues relevant to professionals in general health care settings.

NUR 3522 Elective Practicum 1 QH

Provides an individualized field experience in an appropriate agency or community setting. Focuses on a selected client population to allow students to observe and practice specific therapeutic skills supervised by the course instructor. *Prereq.* Permission of the instructor.

NUR 3531 Research Advisement 2 QH

Focuses on implementing the research project or thesis on psychiatric-mental health nursing with assistance from faculty research advisers. Requires data collection, analysis, and presentation of research findings. *Prereq.* NUR 3105.

NUR 3541 Psychiatric-Mental Health Directed Study 3 QH

Allows student to develop an individualized plan to attain specific knowledge and skills related to professional goals. Consists of library study or reading, individual instruction, research, practicum, or other appropriate activity. *Prereq.* Academic adviser's approval.

Nursing Administration

NUR 3601 Nursing Administration 1: Health Care Organizations 3 QH

Analyzes administrative theories to prepare student for nursing administration in various health care settings. Focuses on structure, objectives, and policies of health care organizations. Examines the influence of outside groups, health insurers, government, and special interest groups on delivery of health care services. *Prereq.* Concurrent NUR 3104.

NUR 3602 Nursing Administration 2: Finances and Information Systems 3 QH

Presents a theoretical foundation to use and analyze management information systems. Emphasizes the decision making process of fiscal management and allocation of resources. Considers staffing, patient classification systems, reimbursement policies, costing services, and budgeting/fiscal management from entry- to middle-level nursing administrator's perspective. Requires computer exercises with spreadsheets and database management programs. *Prereq.* Concurrent NUR 3601.

NUR 3603 Nursing Administration 3: Humane Resource Management 3 QH

Focuses on professional personnel development and management. Examines department organization, staff development, change, collective bargaining, and quality assurance within the nursing administrator's scope of responsibility. Explores concepts of interper-

sonal relationships, group dynamics, and consultation to enhance administrative skills. *Prereq.* Concurrent NUR 3602.

NUR 3604 Role Development Seminar 3 QH

Explores the role of the clinical nurse specialist. Focuses on the use of collaboration and change strategies in various practice settings. Includes consultation, education, liaison, supervision, peer review, and referral. Students meet together for seminar and are assigned to integrated specialty groups to focus on issues related to advanced practice in nursing. *Prereq.* Concurrent NUR 3603.

NUR 3611 Nursing Administration Practicum 1 4 QH

Provides an administrative learning experience in a clinical setting with a nursing administrator as preceptor. Applies theory through observing, participating in, and researching organizational functioning and nursing leadership. Focuses on departmental structure and issues related to the role of the nursing administrator in a weekly didactic seminar with faculty. *Prereq.* Concurrent NUR 3104 or NUR 3601.

NUR 3612 Nursing Administration Practicum 2 4 QH

Provides an administrative learning experience in a clinical setting with a nursing administrator as preceptor. Applies theory through observing, participating in, and researching organizational functioning and nursing leadership. Focuses on management and leadership

functions and issues related to the role of the nursing administrator in a weekly didactic seminar with faculty. *Prereq. Concurrent NUR 3602 or NUR 3611.*

NUR 3613 Nursing Administration Practicum 3 4 QH

Provides an administrative learning experience in a clinical setting with a nursing administrator as preceptor. Applies theory through observing, participating in, and researching organizational functioning and nursing leadership. Focuses on communicating and implementing the role of the nursing administrator in a weekly didactic seminar with faculty. *Prereq. Concurrent NUR 3603 or NUR 3612.*

NUR 3620 Nurse Entrepreneur 3 QH

Provides the theoretical foundation for planning and operating a business from the perspective of the nurse entrepreneur. Identifies strategies for achieving business goals. Emphasizes development of a winning business plan through a step-by-step approach with a strong focus on marketing, planning, and financial analysis.

NUR 3631 Research Advisement 2 QH

Focuses on implementing the research project or thesis on nursing administration with assistance from faculty research advisers. Requires data collection and analysis and presentation of research findings. *Prereq. NUR 3105.*

NUR 3641 Nursing Administration Directed Study 3 QH

Allows student to develop individualized plan to attain specific knowledge and skills related to professional goals. Consists of library study or reading, individual instruction, research, practicum, or other appropriate activity. *Prereq. Academic adviser's approval.*

Graduate School of Pharmacy and Allied Health Professions

INT 3101 Biochemistry 1

Offers a description of the biochemical components of the cell including carbohydrates, lipids, prostaglandins, steroid hormones, amino acids, polypeptides, proteins, purines, pyrimidines, nucleosides, nucleic acids, and vitamins. Considers buffers, Henderson-Hasselbalch equation, and the importance of pKa. *Prereq.* One year of organic chemistry.

INT 3102 Biochemistry 2

Discusses enzymes, enzyme kinetics, and mechanisms of enzyme reactions, of intermediary metabolism and of biological oxidation-reduction reactions, bioenergetics, and the electron transport chain. Considers carbohydrate metabolism including the glycolytic pathway, the citric acid cycle, and the pentose phosphate pathway. *Prereq.* INT 3101.

INT 3103 Biochemistry 3

Presents lipid metabolism, including the fatty acid cycle, the biosynthesis of fatty acids, and the biological formation of the prostaglandins, cholesterol, and steroid hormones. Studies the metabolism of the various amino acids, including the urea cycle, one-carbon fragments, transamination reactions, and aromatic hydroxylations. Discusses metabolism of nucleic acids and their building blocks, as well as the genetic basis of protein synthesis, the genetic code, and the mechanisms of control. *Prereq.* INT 3102.

INT 3201 Applications of Mass Spectrometry

Examines the principles governing the fragmentation and ionization of organic molecules, the interpretation of mass spectra, and applications of mass spectrometry to the solution of selected problems in the fields of chemistry, biochemistry, and forensic sciences. *Prereq.* One year of organic chemistry, basic physics, physical organic chemistry desirable but not essential.

MHP 3101 Health Care Delivery

Explores the principal components of the health care delivery system with an emphasis on its social, political, and economic evolution and development. Discusses future trends and their implications.

MHP 3102 Health Research Methodology

Covers aspects of experimental design and hypothesis testing. Uses critical reading of clinical trials, cohort and retrospective studies, and health services research articles to illustrate principles of research design and conduct. Students will be expected to complete a research protocol. *Prereq.* MHP 3101.

MHP 3103 Professional Dynamics in Health Care

Examines skills and techniques used in developing leadership attributes, in creating change, and in working effectively with individuals and groups in the health care environment. Emphasizes differing, successful approaches for both leadership and interaction in the ambulatory, institutional, professional, legislative, and regulatory health care setting. *Prereq.* MHP 3101 and MHP 3102.

MHP 3111 Operations Management in Health Care

Studies the application of systems analysis to health care institutions with particular attention to concepts

for the management of ancillary services departments. Uses case studies to analyze work sampling, work flow, systems design, materials management, supply utilization, human resource management, and productivity improvements. Requires course project.

MHP 3112 Financial Analysis in Health Care

Focuses on the application of financial analytic principles to health care institutions with particular attention to concepts for the management of ancillary services departments. Uses case studies and hospital financial reports to develop such techniques as cost accounting and budgeting. Emphasizes practical use of financial techniques for analyzing alternatives and decision making, as well as functional knowledge of financial management in health care. *Prereq.* MHP 3111.

MHP 3200 Fundamentals of Regulatory Risk Assessment

Applies toxicologic, statistical, and pharmacokinetic principles to assessing the impact on health of hazardous exposure to chemical carcinogens and noncarcinogens found in the environment. Focuses on mathematical methods for quantitative risk assessment, exposure assessment, and risk characterization. Includes lab exercises and term paper assignments for in depth review of the key processes in risk assessment. Uses major risk assessments as examples such as dioxin, ozone, benzene, and ethylene dibromide.

MHP 3201 Biometrics

Explores the fundamental principles of experimental design and statistical analysis, emphasizing biomedical research. Topics include descriptive statistics, hypothesis testing, correlation, regression, and chi-square test.

MHP 3221 Health Science Education 1

Offers an overview of various aspects of education in the health-related professions, including design and use of behavioral objectives, evaluation tools (both clinical and didactic), and a survey of various teaching methods. Discusses current journal literature.

MHP 3222 Health Science Education 2

Examines various packages of self-instructional aids. With the aid of lecture material and independent assignments, each student will design and produce a fifteen-minute autotutorial and will present it to the class for critique. Current journal literature will also be used.

MHP 3401 Health Policy Analysis and Evaluation

Presents the application of analytic techniques (for example, decision analysis, benefit-cost analysis, cost-effectiveness analysis) to the forming, implementing, and evaluating of health policies and health care programs. Analysis of past and present studies in allocation of health care resources will examine the analytic as well as the political basis for decisions. Students critique published case analyses in class. A written analysis of a future proposal or current program is required. *Prereq.* MHP 3101, MHP 3102, or equiv.

MHP 3402 Health Policy Seminar 1 1 QH
Analyzes a selected topic from health policy literature. Students will be expected to evaluate and critique published articles and lead a seminar session. *Prereq.* MHP 3101 and MHP 3102.

MHP 3403 Health Policy Seminar 2 1 QH
Continues MHP 3402.

MHP 3404 Health Policy Seminar 3 1 QH
Continues MHP 3403.

MHP 3801 MHP Thesis 2 QH
Student may register three times for a total of 6 QH of credit. *Prereq.* Written permission.

MHP 3802 MHP Research Report 2 QH
Student may register for this course three times for a total of 6 quarter hours of credit. *Prereq.* Written permission.

MHP 3810 MHP Directed Study 3 QH
Offers directed research in health studies. Research and study under the direction of a faculty member. *Prereq.* Written permission.

MLS 3301 Functions of the Human Systems 2 QH
Examines physiology of the nervous, endocrine, muscular, cardiovascular, respiratory, urogenital, and digestive systems. *Prereq.* Chemistry and biology.

MLS 3302 Pathophysiology 1 2 QH
Considers disease processes as appropriate and inappropriate variants of normal physiological functions. Examines certain important and illustrative diseases rather than a survey or catalog of diseases in general. *Prereq.* Mammalian physiology; knowledge of biochemistry is helpful.

MLS 3303 Pathophysiology 2 2 QH
Continues MLS 3302. *Prereq.* MLS 3302.

MLS 3304 Cellular Pathology 3 QH
Investigates cell aging and cell death mechanisms; reactions of cells to injury; the effects of ischemia, oxides of nitrogen, ozone, carbon tetrachloride, mercury, cadmium; immune injury; and theories of carcinogenesis. Lectures are based on recent review and current research articles. *Prereq.* Chemistry, biology; biochemistry, and cell biology helpful.

MLS 3310 Principles of Medical Endocrinology 2 QH
Studies endocrine-related clinical abnormalities emphasizing the relationship of clinical lab measurement to biochemical dysfunctions of the endocrine system. *Prereq.* Biochemistry.

MLS 3313 AIDS 2 QH
Offers an exploration of clinical, immunological, virological, epidemiological, and social facets of AIDS. Includes an introductory exposition of the present state of the disease and several sessions critically dissecting the pertinent literature.

MLS 3321 Hematology 1—Disorders of the Erythrocytes 2 QH
Examines the physiology and pathology of red blood cells and hemoglobin. *Prereq.* Some knowledge of basic

hematology is essential, and familiarity with general mammalian biochemistry is strongly recommended.

MLS 3322 Hematology 2—Disorders of the Leukocytes 2 QH

Explores the pathophysiology of white cell disorders. Discusses clinical and lab correlations of leukemias, myeloproliferative, and lymphoproliferative disorders, infections, and inherited leukocyte anomalies. *Prereq.* Undergraduate biochemistry.

MLS 3323 Hematology 3—Hemostasis 2 QH
Presents clinical and lab correlations of hemostatic disorders. Covers material from the basic to the most recent experimentation, technical, and clinical applications. *Prereq.* Undergraduate biochemistry, hematology course, or experience.

MLS 3331 Genetic and Immunologic Aspects of Blood Group Identification 1 QH

Offers lectures dealing with immune response, physical chemistry of immunohematological tests, immunological diseases, tests for detection and identification of antibodies and antigens, principles of human genetics, blood group genetics, and population and family studies. Conducted at the New England Deaconess Hospital Blood Bank Training Center. *Prereq.* MLS 1631 and permission of instructor.

MLS 3332 Principles and Foundations of the Blood Group Systems 2 QH

Presents lectures and experience with the human blood group systems, their antigens and antibodies, genetic inheritance and interactions, frequencies, mutants and alterations by disease states, and blood group testing. Conducted at the New England Deaconess Hospital Blood Bank Training Center. *Prereq.* MLS 3331, MLS 3531, and permission of instructor.

MLS 3333 Design and Problems of Compatibility Testing 1 QH

Includes lectures and experience with the design and purpose of compatibility testing; factors complicating compatibility procedure; techniques employed in compatibility testing; leukocyte, platelet, and tissue compatibility; and special crossmatch and transfusion procedures. Conducted at the New England Deaconess Hospital Blood Bank Training Center. *Prereq.* MLS 3331, MLS 3531, MLS 3332, MLS 3532, and permission of instructor.

MLS 3334 Principles of Hematology and Coagulation Related to Transfusion 3 QH

Offers lectures and lab experience related to hemoglobins; iron metabolism; blood formation; blood volume functions of circulating cells; anemias; leukemias and lymphomas; coagulation theories, factors, and disorders. Conducted at the New England Deaconess Hospital Blood Bank Training Center. *Prereq.* Permission of instructor.

MLS 3335 Transfusion Therapy 2 QH

Presents lectures discussing the selection of blood donors, phlebotomy and pheresis procedures, processing requirements, donor reaction, blood components, and physical characteristics of stored blood. Topics

include indications for transfusion, transfusion reaction, therapeutic phlebotomy and pheresis, autologous transfusions, pediatric transfusions, massive blood replacement, extracorporeal perfusion, cardiopulmonary bypass, and dialysis. Conducted at the New England Deaconess Hospital Blood Bank Training Center. *Prereq.* *MLS 1631 and permission of instructor.*

MLS 3336 Immunohematology Administration 2 QH
Offers lectures and experience dealing with standards for blood banks and transfusion services (federal, state, AABB); requirements for state, FDA, and NIH (BOB) licensing; the American Blood Commission; and inspection and accreditation donor procurement. Considers interbank blood exchange; organization of blood bank and transfusion service; medical and legal aspects of transfusion practice; design of physical facilities; and evaluation, selection, and maintenance of equipment. Other topics include evaluation and selection of supplies and reagents; preparation; labeling requirements; quality control systems; proficiency testing programs; record keeping; computer principles, use of computer facilities; and operations of donor facilities and blood bank labs. Conducted at the New England Deaconess Hospital Blood Bank Training Center. *Prereq.* *MLS 1631 and permission of instructor.*

MLS 3338 Immunobiology 2 QH
Presents topics of current interest in immunobiology, such as cell interactions in the immune response, the major histocompatibility complex, antibody structure and function and the regulation of the immune response. *Prereq.* *Permission of instructor.*

MLS 3339 Immunopathology 2 QH
Presents the basic elements of immunopathology. Reviews the components and function of the immune system. Covers the disorders of the complement system, the biologic mechanisms of immunologically induced tissue injury (hypersensitivity reactions), autoimmunity, and immunodeficiency. Considers the immunological features of cancer and transplant rejection. *Prereq.* *MLS 3338.*

MLS 3341 Medical Bacteriology 3 QH
Focuses on those aspects of clinical bacteriology that are of significance in understanding the interaction among the infecting organism, the host and host defenses that affect symptoms, diagnosis, and chemotherapy of bacterial disease. *Prereq.* *Undergraduate microbiology.*

MLS 3342 Current Topics in Microbiology 3 QH
Emphasizes current topics in infectious diseases. Discusses topics in microbiology that are of medical and epidemiological interest during the time the course is being offered. *Prereq.* *Undergraduate microbiology and immunology.*

MLS 3343 Medical Virology 3 QH
Focuses on those aspects of clinical virology that are significant in understanding the interaction among infecting viruses, the host and host defenses that affect symptoms, diagnosis, and therapy of viral disease.

Prereq. *Undergraduate microbiology and immunology.*

MLS 3345 Epidemiology 2 QH
Studies the basic concepts of epidemiology, causes of disease, factors contributed by agents, the human host, and the environment. Examines the acquisition and evaluation of data, as well as the relationship of person, time, and place. Reviews case studies and problems, including diet and cancer, causes of heart disease, and a review of the AIDS epidemic. *Prereq.* *Permission of instructor.*

MLS 3351 Interpretive Clinical Chemistry 2 QH
Presents the basic concepts in lab investigations; diagnostic enzymology, immunology, and clinical toxicology; organ system diseases; metabolic diseases; and special topics such as pediatric clinical biochemistry and cancer-associated biochemical abnormalities. *Prereq.* *INT 3101, INT 3102, INT 3103, undergraduate clinical chemistry, analytical and organic chemistry, and medical physiology.*

MLS 3352 Clinical Chemistry Techniques and Instrumentation 2 QH
Discusses the current analytical techniques and instrumentation used in clinical and research labs. Emphasizes developing a thorough understanding of the principles of these techniques and instrumentation. Covers applications to specific analyses and instrument troubleshooting. *Prereq.* *INT 3101, INT 3102, INT 3103, MLS 3354 undergraduate clinical chemistry, analytical and organic chemistry, and medical physiology.*

MLS 3353 Clinical Chemistry Quality Assurance 2 QH
Discusses statistical procedures; establishing and using reference ranges; analyzing goals and clinical relevance of lab procedures; evaluating methods; quality assurance; and sources of biological variation. *Prereq.* *MLS 3352 and biostatistics.*

MLS 3354 Biomedical Analysis 2 QH
Presents the modern reagents and techniques important in purifying and detecting biomolecules. Examples of reagents are radioisotopes, lumiphores, fluorophores, enzymes, electrophores, monoclonal antibodies, DNA probes, protein A, avidin-biotin, and detergents. Examples of techniques are chromatography, including GC and HPLC, radioenzymatic assays, 2D-electrophoresis, immunoassays, blotting assays, and mass spectrometry. *Prereq.* *INT 3101, INT 3102, and INT 3103.*

MLS 3355, MLS 3356 Seminar and Report in Clinical Chemistry 1, 2 2 QH
Offers reports and discussions of current journal articles in clinical chemistry. *Prereq.* *PMC 3301.*

MLS 3365 Medical Laboratory Management 1 3 QH
Provides an opportunity for medical technologists to prepare themselves for managerial responsibilities. Introduces the basic skills and knowledge appropriate to the administration of a medical lab rather than specialized functional techniques. The basic objectives of the concentration are: to confront the student with

appropriate learning experiences; to increase skills and knowledge in basic disciplines underlying administrative practice; and to develop judgment and skills in problem analysis and decision making in organizations. Discusses supervision, operations, organizations, productivity, human behavior, communications, and personnel management. *Prereq.* Medical lab experience or permission of instructor.

MLS 3531 Genetic and Immunologic Aspects of Blood Group Identification Laboratory 1 QH

Offers lab experience with immune response, physical chemistry of immunohematological tests, immunological diseases, tests for detection and identification of antibodies and antigens, principles of human genetics, blood group genetics, and population and family studies. Conducted at the New England Deaconess Hospital Blood Bank Training Center. *Prereq.* MLS 1631 and permission of instructor.

MLS 3532 Principles and Foundations of the Blood Group Systems Laboratory 2 QH

Offers lab experience with human blood systems, antigens and antibodies, genetic inheritance and interactions, frequencies, mutants and alterations by disease states, and blood group testing. Conducted at the New Deaconess Hospital Blood Bank Training Center. *Prereq.* MLS 3331, MLS 3531, and permission of instructor.

MLS 3533 Design and Problems of Compatibility Testing Laboratory 2 QH

Presents lab experience with the design and purpose of compatibility testing; factors complicating compatibility procedures; techniques employed in compatibility testing; leukocyte, platelet and tissue compatibility; and special crossmatch and transfusion procedures. Conducted at the New England Deaconess Hospital Blood Bank Training Center. *Prereq.* MLS 3331, MLS 3531, MLS 3532, and permission of instructor.

MLS 3535 Transfusion Therapy Laboratory 2 QH

Provides lab experience with selection of blood donors, phlebotomy and pheresis procedures, processing requirements, donor reaction, blood components, and physical characteristics of stored blood. Topics include indications for transfusion, transfusion reactions, therapeutic phlebotomy and pheresis, autologous transfusions, cardiopulmonary bypass, and dialysis. Conducted at the New England Deaconess Hospital Blood Bank Training Center. *Prereq.* MLS 1631 and permission of instructor.

MLS 3536 Immunohematology Administration Laboratory 2 QH

Offers lab experience with standards for blood banks and transfusion services (federal, state, AABB); requirements for state, FDA, and NIH (BOB) licensing; the American Blood Commission; inspection and accreditation donor procurement; and interbank blood exchange. Topics include organization of blood bank and transfusion service; medical and legal aspects of transfusion practice; design and physical facilities; evaluation, selection, and maintenance of equipment;

evaluation and selection of supplies and reagents; preparation; labeling requirements; quality control systems; proficiency testing programs; record keeping; computer principles, and the use of computer facilities; operations of donor facilities; and blood bank labs. Conducted at the New England Deaconess Hospital Blood Bank Training Center. *Prereq.* MLS 1631 and permission of instructor.

MLS 3538 Immunobiology Laboratory 2 QH

Students are required to undertake individual research projects relating to topics covered in lecture.

MLS 3602 Blood Banking—MLS Seminar 1 QH

Revolving topics.

MLS 3603 Clinical Chemistry—MLS Seminar 1 QH

Discusses current research.

MLS 3604 Hematology—MLS Seminar 1 QH

Revolving topics.

MLS 3605 Immunology—MLS Seminar 1 QH

Revolving topics.

MLS 3606 Management—MLS Seminar 1 QH

Revolving topics.

MLS 3607 Microbiology—MLS Seminar 1 QH

Revolving topics.

MLS 3608 Education—MLS Seminar 1 QH

Revolving topics. *Prereq.* MLS 3221 and MLS 3222, or permission.

MLS 3609 Immunohematology—MLS Seminar 1 QH

Revolving topics.

MLS 3801 Graduate Research Report 1 2 QH

Studies a special topic in medical lab science, involving individual research, undertaken and reported under the direction of a faculty member. *Prereq.* Written permission of instructor.

MLS 3802 Graduate Research Report 2 2 QH

Students may register twice (4 QH). Continues MLS 3801. *Prereq.* MLS 3801.

MLS 3821 MLS Thesis 2 QH

Involves analytical or experimental work conducted under the auspices of the department. Students may register three times (6 QH). *Prereq.* Written permission of instructor.

PAH 3101 Principles of Medicine 1 6 QH

Offers an intensive, three quarter, organ-system based sequence encompassing anatomy, physiology, pathophysiology, and therapy of disease. (This course is the major component of the second-year curriculum of the Tufts School of Medicine and meets for approximately eighteen hours per week). *Prereq.* Admission to PharmD Program.

PAH 3102 Principles of Medicine 2 6 QH

Continues PAH 3101. *Prereq.* PAH 3101.

PAH 3103 Principles of Medicine 3 6 QH

Continues PAH 3102. *Prereq.* PAH 3102.

PAH 3201 Drug Literature Evaluation 2 QH
Examines the principles and practice of drug information, literature retrieval, and evaluation of the pharmacy and medical literature. *Prereq.* Admission to PharmD Program.

PAH 3211, PAH 3212, PAH 3213 2 QH each
Pharmacotherapeutics 1, 2, 3

Offers a three quarter sequence in advanced contemporary therapeutics of disease. Topics parallel material presented in the principles of medicine sequence. *Prereq.* Admission to PharmD Program.

PAH 3221 Psychosocial Aspects of Health Care— 1 QH
Seminar

Studies psychological and social concerns that determine patient behavior and impact on health care. *Prereq.* Admission to PharmD Program.

PAH 3231 Pharmacokinetics in Drug Therapy 3 QH
Examines the application of clinical pharmacokinetic information and techniques to patient care. Discusses the strategies of therapeutic drug monitoring for various drug categories and the use of decision analytic techniques in pharmacokinetic consultations. *Prereq.* Admission to PharmD Program or permission of instructor.

PAH 3311 4 QH
PAH 3312, PAH 3313, PAH 3314 3 QH each
Clerkship 1, 2, 3, 4

Offers a four quarter sequence of advanced clinical clerkship rotations in patient care at various affiliated clinical sites. Students participate in "rounding" activities with medical and other health professionals and have the opportunity to provide drug information in the therapeutic decision-making process. The emphasis in these rotations is on helping students develop skills and familiarity with the application of drugs in the clinical setting as well as the usual progression of disease. Rotations include internal medicine, ambulatory care, and elective experiences. Involves approximately forty hours per week. *Prereq.* Admission to PharmD Program.

PAH 3321 Patient Assessment 2 QH
Explores the general principles of history taking and physical examination. Focuses on organ systems of particular importance to the clinical pharmacist in monitoring drug response. *Prereq.* Admission to PharmD Program.

PAH 3601, PAH 3602 Seminar 1, 2 1 QH each
Offers a two quarter sequence covering topics of relevance to the clinical pharmacy practitioner. Principles of effective communication and teaching are discussed. Students are expected to make oral presentations covering various therapeutic and related subjects as well as the progress of their investigational projects. *Prereq.* Admission to the PharmD Program.

PAH 3643 Biomedical Science Research Report 1 2 QH
Requires students to present and participate in research group-related seminars, the format of which will be determined by students' advisers. *Prereq.* Doctoral students only.

PAH 3644 Biomedical Science Research Report 2 2 QH
Continues PAH 3643. *Prereq.* PAH 3643.

PAH 3645 Biomedical Science Research Report 3 2 QH
Continues PAH 3644. *Prereq.* PAH 3644.

PAH 3646 Biomedical Science Research Report 4 2 QH
Continues PAH 3645. *Prereq.* PAH 3645.

PAH 3647 Biomedical Science Research Report 5 2 QH
Continues PAH 3646. *Prereq.* PAH 3646.

PAH 3648 Colloquium Presentation 1 QH
Requires students to present one formal seminar on their research. This presentation will be open to all those interested. *Prereq.* Doctoral students only.

PAH 3701 Human Nutrition 3 QH
Studies nutrients considered essential for optimal human nutrition. Examines the digestion, absorption, metabolism, and excretion of each nutrient. Discusses food sources recommended, intakes for normal individuals, deficiency, and toxicity syndrome of public health interest.

PAH 3705 Nutrition Seminar 1 QH
Aids the student in developing critical thinking regarding nutrition issues that are important to today's consumer. Introduces the student to a variety of readings that present varying viewpoints about nutrition issues and discusses these issues.

PAH 3707 Experimental Design and Biometrics 3 QH
Discusses fundamental principles of experimental design and statistical analysis, with particular emphasis on clinical research. Topics include descriptive statistics, hypothesis testing, analysis of variance, correlation, regression, chi-square test, and nonparametric methods.

PAH 3731 New Computers for Health Care 3 QH
Introduces computer applications and management of computer applications in health care. Applies the principles of information flow or clinical patient data to the information system lifecycle, emphasizing systems analysis process applied to health care application selection, implementation, evaluation, and monitoring. Analyzes representative applications in different health care disciplines and stresses the manager's role.

PAH 3799 Dissertation Continuation 0 QH
Continues PAH 3813. *Prereq.* PAH 3813 must be taken three times before registering for this course.

PAH 3801 Investigational Project 2 QH each
Offers the opportunity to demonstrate the ability to identify a problem within the domain of clinical pharmacy, formulate a hypothesis, develop methods to collect and interpret the data in order to test the hypothesis, and report the investigation in writing using a thesis format. (Note "Investigational Component of PharmD Program.") *Prereq.* Admission to PharmD Program.

PAH 3804 Investigational Project Continuation 1 QH
Prereq. PAH 3801.

- PAH 3813 Dissertation** 0 QH
Prereq. Written consent.
- PAH 3805 Independent Study PharmD** 3 QH
Prereq. Written permission of instructor.
- PCL 3101 Concepts in Pharmacology** 2 QH
Offers in-depth coverage of the fundamental principles of pharmacology. Covers pharmacodynamics, including dose-effect relationships and drug-receptor interactions. Presents pharmacokinetic concepts, including absorption, distribution, and elimination as well as common pathways of drug metabolism. Other topics include pharmacogenetics, drug resistance, tolerance, and physical dependence. Provides an overview of the drug discovery and development process. The course is a necessary prerequisite for succeeding courses in pharmacology and toxicology. *Prereq. Admission to a graduate department or permission of the instructor.*
- PCL 3121 Experimental Pharmacology** 2 QH
Offers a lab experience with experimental pharmacology involving whole animal, isolated tissues, and drug receptors to demonstrate classical research methodologies. *Prereq. PCL 3101, PCL 3153, and admission to Pharmacology or Toxicology programs, or permission of Pharmacology Program director.*
- PCL 3131 Receptor Pharmacology** 2 QH
Reviews receptors for drug substances and for endogenous ligands in a format that combines lecture presentations and discussion. Focuses on the evaluation of current literature. Covers techniques available to study receptors; various models for receptor-ligand interaction; stereochemical aspects of receptor interactions; receptor-mediated coupling mechanisms; and evaluation of several specific receptor systems. *Prereq. MLS 3301, PCL 3101, INT 3101, INT 3102, INT 3103, or permission of instructor.*
- PCL 3141 Pharmacology of Drug Dependence** 2 QH
Surveys the major drug classes subject to misuse and addiction. Emphasizes general concepts of tolerance and dependence, the general pharmacology of prototypes of abused drugs, patterns and consequences of abuse in humans, and recent research advances. Examines selected research papers critically to stimulate quantitative pharmacologic thinking. *Prereq. PCL 3101.*
- PCL 3153 Pharmacological Basis of Therapeutics 1** 2 QH
Surveys the chemical and pharmacological basis of the major classes and characteristics of a prototype drug from each class. Characteristics studied include indications, adverse reactions, contraindications, structure-activity relationships, metabolism, mechanisms of action, and clinically significant interactions. Reading assignments cover animal models relevant to therapeutic screening and/or testing and the appropriate design of clinical trials. *Prereq. PCL 3101.*
- PCL 3154 Pharmacological Basis of Therapeutics 2** 2 QH
Continues PCL 3153. *Prereq. PCL 3153.*
- PCL 3155 Pharmacological Basis of Therapeutics 3** 2 QH
Continues PCL 3154. *Prereq. PCL 3154.*
- PCL 3301 Pathology** 2 QH
Introduces the study of the nature of disease, emphasizing the general mechanisms and pathogenesis. Of paramount importance is the effect of disease on the human body. The language of disease is stressed. Basic principles of disease processes and more common special diseases are extensively covered. A research paper may be assigned at the discretion of the instructor. *Prereq. anatomy and physiology.*
- PCL 3601 Pharmacology Seminar** 1 QH
Provides the opportunity for students to gain experience in oral and written presentation and in interpreting pharmacological data. Offers topics from current pharmacology literature selected by participants. *Prereq. PCL 3101.*
- PCL 3801 Pharmacologic Methods 1** 3 QH
Students carry out experiments in the lab of a pharmacology or toxicology faculty member. The experiments serve to demonstrate the techniques utilized in that lab to study a pharmacologic question. *Prereq. PhD students only.*
- PCL 3802 Pharmacologic Methods 2** 3 QH
Continues PCL 3801. *Prereq. PCL 3801.*
- PCL 3811 Research Report in Pharmacology 1** 2 QH
Offers a selected research project undertaken by the student under the direction of a faculty member. *Prereq. PCL 3101.*
- PCL 3812 Research Report in Pharmacology 2** 2 QH
Continues PCL 3811. *Prereq. PCL 3811.*
- PCL 3821 Pharmacology Thesis** 2 QH
Students may register three times (6 QH). *Prereq. Written permission from program director.*
- PCT 3101 Introduction to Biopharmaceutics and Pharmacokinetics** 3 QH
Offers the opportunity to students to remedy deficiencies in biopharmaceutics and pharmacokinetics. Topics include general concepts of one and two compartment models; linear and nonlinear pharmacokinetics; drug kinetics after intravenous, intramuscular, or oral administration; practical methods of compartmental models utilizing plasma and/or urinary data; multiple dosing kinetics; bioavailability and bioequivalence of drug products; and effect of renal impairment on drug kinetics. *Prereq. Permission of instructor.*
- PCT 3111 Clinical Pharmacokinetics** 2 QH
Focuses on applying various pharmacokinetic techniques to estimating dosage regimens, evaluating drug therapy, consulting on drug selection, and assessing bioavailability and bioequivalence data. *Prereq. A background in biopharmaceutics or permission of instructor.*
- PCT 3112 Pharmacokinetics** 3 QH
Acquaints graduate students with the theoretical compartmental analysis in pharmacokinetics. Topics include derivation and treatment of general equations for linear and nonlinear mammillary models. Uses of Laplace transform, transfer functions, general partial

fraction theorem, and input-disposition functions in pharmacokinetics. Emphasizes practical methods used to kinetically analyze the absorption, distribution, and elimination of drugs. Explores computer methods, physiological models, and stochastic compartmental systems. *Prereq.* MTH 1245, MTH 1246, graduate standing, and permission of instructor.

PCT 3161 Drug Metabolism 2 QH
Presents the current principles and methods for studying the metabolic transformation and physiological disposition of drugs and other chemicals of pharmacological and toxicological interest. Covers the chemistry of Phase I and Phase II reactions from a mechanistic and empirical viewpoint. Assesses the role of structure, bonding, molecular configuration, substitution, and related physiochemical factors in the enzymatic reactions, as well as the effects of enzyme induction and other factors in the enzymatic reaction. Explores the effects of enzyme induction and other factors such as species, sex, and age on the extent of metabolism. *Prereq.* PCL 3010 or permission of instructor.

PCT 3200 Advanced Pharmaceutics 2 QH
Studies the theoretical principles of modern physical pharmacy. Emphasizes physical insight and mathematical rigour. Topics include application of basic principles of thermodynamics, colligative properties, colloidal systems, molecular and micellar association, surface chemistry, mass transport phenomena, and chemical stability of drugs. *Prereq.* PCT 1340, PCT 1350, or permission of instructor.

PCT 3205 Novel Drug Delivery System 2 QH
Conventional use of drugs in the treatment of prevention of disease can be hampered by their indiscriminate action, often leading to side effects. In addition, many drugs are unable to reach target areas in the body in effective concentrations, while others are prematurely excreted or inactivated. During the last decade there have been concerted attempts to circumvent such problems by the use of delivery systems that transport drugs safely to sites when they are needed, and facilitate and/or control their release. This class attempts an in-depth examination of the methodology and significance of these novel delivery systems. Topics include the following systems that are currently under investigation: nanoparticles, cellular vectors, microcapsules, microspheres, prodrugs, liposomes as drug carriers, polymeric systems, and macromolecular systems such as DNA, glycoproteins, monoclonal antibodies, and hormones. *Prereq.* PCT 3101, PCT 3200 or permission of instructor.

PHP 3101 Hospital Pharmacy Administration 1 3 QH
Studies management of a department's personnel and financial resources. Covers management skills, personnel administration and organization, as well as budget preparation, analysis, and control, and hospital reimbursement.

PHP 3102 Hospital Pharmacy Administration 2 3 QH
Presents an overview of hospital pharmacy services and an introduction of areas of the hospital that either require or relate to pharmacy services. Discusses

hospital administration, materials management, quality assurance programs, committee responsibilities, and drug distribution systems, as is the development and writing of a proposal for new services.

PHP 3121 Health Care Administration 1 3 QH
Examines the socioeconomics and statistics of health care, including governmental programs, legislative trends, third-party insurance and welfare programs, and other areas that may affect the management of the modern institutional pharmacy. *Prereq.* Admission to the hospital pharmacy program or permission of instructor.

PHP 3131 Computer Applications in Hospital Pharmacy 3 QH
Reviews past, present, and future applications of computer systems in institutional practice. Covers management aspects of computer systems development and selection. Discusses microcomputers and departmental computers to support clinical and management practice.

PHP 3141 Legal Aspects/Federal Legislation in Pharmacy 2 QH
Analyzes the federal and state laws relating to the distribution of drugs in the institution. Topics include common-law liabilities such as malpractice and other frequently encountered problems. *Prereq.* Admission to hospital pharmacy program.

PHP 3165 Special Topics In Hospital Pharmacy 2 QH
Selected topics of interest to hospital pharmacy practitioners.

PHP 3201 Clinical Pharmacy 3 QH
Considers the patient-oriented aspects of the application of therapeutic agents to hospital patients. Studies the relation of therapeutic regimens to lab tests and drug interactions, as well as the role of the hospital pharmacist as an active member of the health-care team dealing directly with inpatients and outpatients. *Prereq.* Admission to hospital pharmacy program or permission of instructor.

PHP 3211 Contemporary Therapeutics 1 3 QH
Explores recent developments in current therapeutic approaches and their rationale in the treatment of cardiovascular, neurological, gastrointestinal, musculoskeletal, and metabolic diseases of a noninfectious nature. Discusses therapy related to aging and selected genetic diseases. *Prereq.* PHP 3201.

PHP 3212 Contemporary Therapeutics 2 3 QH
Examines current concepts of infectious diseases and the rationale for the chemotherapeutic treatment of these conditions. Studies diseases of the blood and blood-forming organs, neoplastic disease, and diseases related to deficiency states. *Prereq.* PHP 3201.

PHP 3231 Drug Monitoring 3 QH
Presents the process by which drugs are monitored to determine their effectiveness, safety, prevention of iatrogenic factors, drug-drug interactions, and matters affecting patient compliance with a therapeutic regimen. Considers the utilization of this information in improving patient care. *Prereq.* Written permission.

PHP 3241 Sterile Products 3 QH
Studies theory principles, methods, and techniques in preparing sterile, pyrogen- and particulate-free products. Discusses equipment and lab design required for manufacturing different types of sterile products and the practical considerations essential for their production. *Prereq.* *Permission of instructor.*

PHP 3601 Seminar on Hospital Pharmacy 3 QH
Offers a seminar on current developments or specific problems in hospital pharmacy that have been studied in-depth by students with guidance from the graduate faculty. The student presentations may be alternated with guest speakers on topics of current interest. Student participation in the discussions is an essential objective of the course. *Prereq.* *Admission to hospital pharmacy program.*

PHP 3801 Hospital Pharmacy Thesis 2 QH
Students may register three times (6 QH). *Prereq.* *Written permission of instructor.*

PMC 3101 Chemistry of CNS Depressants 3 QH
Presents and discusses the chemistry, structure-activity relationships, and mechanism of action of general anesthetics, hypnotics and sedatives, anti-epileptics, analgesics, tranquilizers, and muscle relaxants. Considers the mechanics of drug design and methods of modification. *Prereq.* *PMC 3105 or permission of instructor.*

PMC 3102 Chemistry of Autonomic Drugs 3 QH
Discusses drug action on the central nervous system, emphasizing the action mechanism of the chemical mediators of the peripheral nervous system. Considers the role of the agents affecting this system—adrenergic and cholinergic and reversible and irreversible inhibitors of these systems—in relation to their chemical structure and biological activity. *Prereq.* *PMC 3105 or permission of instructor.*

PMC 3103 Chemistry of Anti-Infectives 3 QH
Studies the organic medicinal chemistry of various chemotherapeutic agents used to treat infectious diseases. Focuses on chemistry, mechanism of action, structure activity relationships, and recent research. Topics include antibacterials (sulfonamides, antifolates, and quinolones), antibiotics (beta-lactams, aminoglycosides, and tetracyclines), antivirals, and investigational drugs used in HIV infection therapy. *Prereq.* *PMC 3105 and biochemistry or permission of instructor.*

PMC 3104 Biochemical and Pharmacological Principles of Cancer Chemotherapy 3 QH
Presents recent developments in new approaches to the treatment of cancer, including alkylating agents, antimetabolites, hormones, miscellaneous compounds, and combinations of the above with radiation and immunology. Explores possible mechanisms of chemotherapeutic action. *Prereq.* *PMC 3105 or permission of instructor.*

PMC 3105 Principles of Medicinal Chemistry 3 QH
Presents fundamental chemical and stereochemical principles that account for properties of drugs and contribute to an understanding of drug action. Focuses on the physicochemical properties of functional groups as they relate to overall properties of drug molecules. Topics include delivery of drugs to the central nervous system in terms of lipophilicity/hydrophilicity, ionization potential and hydrogen-bonding capability; the interaction of drugs with neurotransmitter, hormonal, and neurohormonal systems; qualitative and quantitative structure activity relationships; drug biotransformation; and principles of and recent developments in drug design.

PMC 3171 Heterocyclic Drugs in Medicinal Chemistry 3 QH
Studies the application of the combined principles of medicinal and heterocyclic chemistry to the synthesis of pharmaceutically useful compounds. Emphasizes a critical evaluation of the literature methods with respect to synthesis and biological activity. *Prereq.* *Advanced organic chemistry or permission of instructor.*

PMC 3511 Advanced Drug Synthesis 4 QH
Presents the application of synthetic and analytical techniques to the preparation of biologically active compounds and their intermediates. Demonstrates the process of drug development from design to synthesis to final characterization. Includes laboratory documentation and report preparation.

PMC 3601 Medicinal Chemistry Seminar 1 QH
Reports and discussions involving current journal articles and research in medicinal chemistry. *Prereq.* *PMC 3101.*

RSC 3201 Radiopharmaceutical Chemistry 3 QH
Discusses the application of chemistry to the design and synthesis of radiodiagnostic agents. Presents the properties of the radionuclides and their biological carriers as they relate to their uses in nuclear medicine. *Prereq.* *PMC 3105 or permission of instructor.*

RSC 3811 Radiopharmaceutical Chemistry 2 QH
Research Report 1
Provides the student with a selected research project related to radiopharmaceutical chemistry under the supervision of a faculty member. Involves a laboratory project or an extensive literature review of topic of current interest in the field.

TOX 3101 Concepts in Toxicology 1 3 QH
Presents the principles of toxicology from an organ system perspective. Focuses on the concepts used to evaluate toxicity; the mode of injury at the organ and cellular level; and the basic subcellular mechanisms through which toxic agents produce damaging effects. Uses recent toxicological literature to introduce concepts for evaluating toxicity through data analysis.

TOX 3102 Concepts in Toxicology 2 3 QH
Continues TOX 3101. Emphasizes the interpretation of toxicological literature to evaluate the risk involved in exposure to prototype chemicals. Employs structure activity and biochemical methods of assessment to evaluate the toxicity of major classes of chemical compounds.

TOX 3121 Environmental Toxicology 3 QH
 Discusses the distribution, interaction, and effects of toxic agents on the biosphere. Examines pollutants grouped by chemical and use characteristics including pesticides, food additives, metals, carcinogens, and teratogens. Addresses the action mechanism and selectivity basis of toxic agents. Applies the results of toxicologic investigation to understanding the environment's chemical pollution.

TOX 3501 Biochemical Toxicology Laboratory 4 QH
 Introduces investigative methods for assessing toxicity. Develops the ability to analyze and interpret data generated in lab and in the literature, and sharpens technical report writing skills.

Physician Assistant

The Physician Assistant Program is a post-baccalaureate certificate program. Most of the courses are available to physician assistant students only. Other students interest in enrolling in physician assistant courses must have the permission of the Physician Assistant Program's director.

MLS 1109 Foundations of Medical Laboratory Science 4 QH
 Introduces basic lab methods employed in primary care, including urinalysis, gram staining, hematocrit, hemoglobin, sedimentation rate, white-cell count, and differential. Lab. *Prereq. PA students only.*

PA 1120 Roles, Rules, and Resources for Physician Assistants 2 QH
 Examines the role of physician assistants, including the manner in which they interact with other health professionals, as well as the way in which their role is perceived by others. Provides an understanding of the law as it relates to physician assistants' actions and to help them develop the ability to make referrals to common community resources. *Prereq. PA students only.*

PA 1125 Human Anatomy 2 QH
 Considers the basic structure of the human body, highlighting those features which are of clinical importance. Emphasizes the gastrointestinal, cardiovascular, respiratory, neurological, and musculoskeletal systems. *Prereq. PA students only.*

PA 1133 Physical Diagnosis 1 5 QH
 Presents techniques for taking an accurate history and performing a physical examination as well as organizing the results for oral and written presentation. Includes discussion, demonstrations, and patient workups. *Prereq. PA students only.*

PA 1134 Physical Diagnosis 2 5 QH
 Explores techniques of obtaining and presenting an accurate history; performing a competent and thorough physical examination; and synthesizing the results of the history, physical, and laboratory findings to arrive at an accurate evaluation of the patient. Uses discussion, demonstrations, and patient workups. *Prereq. PA students only.*

PA 1138 Medical Physiology 1 4 QH
 Covers principles of gastrointestinal, respiratory, endocrine, and cardiovascular human physiology. *Prereq. PA students only.*

PA 1140 Medical Physiology 2 2 QH
 Discusses principles of cardiovascular and renal physiology. *Prereq. PA students only.*

PA 1321 Patient Education and Counseling 2 QH
 Provides an opportunity to acquire the knowledge necessary for educating and counseling patients. Demonstrates ways in which to evaluate patients' needs and readiness to learn, as well as the use of common teaching techniques for issues such as chronic disease management, ostomies, diabetes, heart disease, nutrition counseling, and sex education. *Prereq. PA students only.*

PA 1322 Medical Care and Current Social Problems 2 QH
 Studies the principal components of the health care delivery system, with emphasis on services, organization, and funding. Uses selected social problems to demonstrate the operation of the medical care system. *Prereq. PA students only.*

PA 1323 Principles and Concepts of Emergency Medicine 3 QH
 Introduces the principles of life-support techniques. Focuses on the initial management of acute medical and traumatic conditions in hospital and prehospital situations. Students are instructed in basic cardiopulmonary resuscitation techniques. *Prereq. PA students only.*

PA 1335 Principles of Interviewing 2 QH
 Examines various methods of interviewing patients. Focuses on establishing a relationship and understanding the effects of cultural background and psychosocial problems on the patient's response to illness and death and dying. *Prereq. PA students only.*

PA 1336 Pathophysiology and Medicine 1 3 QH
 Presents a systems approach to the principles of disease processes in people. Topics include physiology, pathophysiology, the natural history of disease, diagnostic procedure, and therapeutic measures. Hematology and cardiology problems are usually covered. *Prereq. PA students only.*

PA 1337 Pathophysiology and Medicine 2 3 QH
Continues PA 1336. Covers topics that may include pulmonary, gastroenterology, immunology, and rheumatology problems. *Prereq. PA students only.*

PA 1338 Pathophysiology and Medicine 3 3 QH
Continues PA 1337. Topics may include renal, endocrine, oncology, infectious disease, and sexually transmitted disease problems. *Prereq. PA students only.*

PA 1340 Introduction to Clinical Rotations 4 QH
Offers clinical rotations, expectations, and requirements for students about to enter their clinical year. Some review of history taking and physical examination skills is conducted, and students are instructed in various clinical procedures. *Prereq. PA students only.*

PA 1341 Applied Study in Emergency Medicine 4 QH
During this rotation, the student has the opportunity to become familiar with the problems encountered in an emergency room. The student is responsible for taking medical histories and performing physical examinations on acute as well as nonemergent patients and presenting these to the medical preceptor. When appropriate, the necessary diagnostic and therapeutic measures are performed. Through didactic sessions at the clinical site as well as clinical training, the student may also be exposed to the emergency management and treatment of conditions such as trauma, shock, burns, asthma, poisoning, allergic reactions, seizures, and respiratory failure. *Prereq. Successful completion of first year of Physician Assistant Program.*

PA 1342 Applied Study in Medicine 4 QH
Offers the student opportunity to take and record histories and perform physical examinations during in-hospital rotation. Provides the opportunity to become versed in the assessing and managing a variety of medical problems by attending medical rounds and conferences, performing diagnostic procedures, presenting case write-ups, recording progress notes, and working under the supervision of a doctor of medicine. Emphasis is placed on the skills of collecting, assessing, and presenting patient data for physician review; ordering appropriate laboratory and diagnostic studies; counseling patients in therapeutic procedures; and helping to coordinate the contributions of other health professionals in the management of the patient. *Prereq. Successful completion of first year of Physician Assistant Program.*

PA 1343 Applied Study in Pediatrics 4 QH
During the pediatric rotation, the student may develop familiarity with outpatient pediatric problems through training in clinics and private pediatric offices. Emphasis during this training is on caring for the child from birth through adolescence. Students are given the opportunity to take histories and perform pediatric physical examinations. Diagnosis and management of common childhood illnesses and evaluation of the variations of growth and development are also stressed. Students have the opportunity to develop skills with which to counsel parents on immunizations, child visits, parameters of growth and development, common psychosocial problems, nutrition, and accident

and poisoning prevention. Students may also have the chance to learn how to administer immunizations and do audio and visual screening. *Prereq. Successful completion of first year of Physician Assistant Program.*

PA 1344 Applied Study in Psychiatry 4 QH
Offers exposure to a wide variety of psychiatric problems. Clinical settings include wards, clinics, and multiservice centers. Students are expected to perform mental status exams and to do cognitive testing. Emphasis is on recognizing various types of psychiatric problems that require referral to a specialist and managing those problems that can be handled by the nonspecialists. Assists students in furthering their understanding of effective patient interactions and the psychiatric components of health, disease, and disability. *Prereq. Successful completion of first year of Physician Assistant Program.*

PA 1345 Applied Study in Obstetrics and Gynecology 4 QH
Provides students the opportunity to become involved with obstetric and gynecological services provided by teaching hospitals in the Boston area. Emphasizes pre- and post-natal care, monitoring a woman in labor, assisting in deliveries, and developing the skill necessary to deliver a child in an emergency situation. Students have the opportunity to take obstetrical histories and perform obstetrical examinations. While rotating through gynecology, the student is expected to learn how to assess and manage a variety of common gynecological problems and to counsel patients on family planning. *Prereq. Successful completion of first year of Physician Assistant Program.*

PA 1346 Applied Study in Ambulatory Medicine 1 4 QH
Offers exposure to aspects of general medical and family practice with emphasis placed on personalized care of healthy and sick patients. Patient education, counseling, and integration of community services, as well as medical diagnosis and management, are considered a major part of this rotation. *Prereq. Successful completion of first year of Physician Assistant Program.*

PA 1348 Principles of Orthopedics 3 QH
Discusses common orthopedic problems, including those of the hand, knee, shoulder, and back. Examines special problems of acute trauma and the management of uncomplicated orthopedic cases. Additional topics may include techniques of completing an adequate patient history and physical examination of the orthopedic patient. *Prereq. PA students only.*

PA 1350 Principles of Primary Care Management 3 QH
Studies approaches to and management of the patient in a primary care setting. Discusses specific diseases and medical conditions common to primary care practice, including low back pain, anxiety, fatigue and weight loss, chest pain, gastrointestinal problems, upper respiratory infections, obesity, and dermatologic complaints. Considers psychosocial aspects of disease as well as aspects of prevention. Students are expected to have a sound basis in pathophysiology and medicine. *Prereq. PA students only.*

PA 1353 Principles of Pediatrics**3 QH**

Examines physiological and psychological fundamentals of child development. Focuses on the major common pediatric illnesses, their signs, symptoms, and treatment regimens; various types of medications used in pediatrics, their indication and dosage in relation to specific disorders; and the management of pediatric emergencies such as cardiac arrest, anaphylaxis, convulsions, coma, and high fevers. *Prereq. PA students only.*

PA 1354 Principles of Psychiatry**3 QH**

Offers an opportunity to understand how to work with patients and families exhibiting psychiatric problems. Topics include psychological growth and development, the effect of social milieu on behavior, the psychological bases of drug and alcohol abuse, and the dynamics of psychosomatic problems. *Prereq. PA students only.*

PA 1355 Principles and Concepts of Surgical Intervention in Disease Processes**3 QH**

Studies major and minor surgical conditions, with an emphasis on indications for surgical intervention and pre- and post-operative management in both the ambulatory and inpatient settings. *Prereq. PA students only.*

PA 1356 Basic Diagnostic Radiology**2 QH**

Introduces the underlying principles, use, and interpretation of radiographs pertinent to primary care medicine. *Prereq. PA students only.*

PA 1358 Medical Therapeutics**3 QH**

A case-study format that involves students in planning the management of common disease states. Used to help students understand the clinical use of common therapeutic agents. *Prereq. PA students only.*

PA 1359 Applied Study in Surgery**4 QH**

During this rotation students participate in a variety of surgical patient care responsibilities under the supervision of a surgical resident and/or staff surgeon. The rotation emphasizes general surgery, but the students have an opportunity for varying exposure to other surgical specialties and sub-specialties. Students assist in the initial assessment of the surgical patient, including obtaining an accurate medical history and performing a physical examination. As members of the surgical team, the students are involved in pre-operative management, including patient education and any procedures necessary to prepare the patient for surgery. Students assist the surgeon in the operation room when appropriate and have the opportunity to become familiar with operating room procedures and equipment. Students are also involved in the post-operative evaluation and management of the patient. Students will have the opportunity to attend surgical grand rounds and other surgically oriented educational meetings when available at their rotation sites. *Prereq. Successful completion of first year of Physician Assistant Program.*

PA 1360 Applied Study in Ambulatory Medicine 2**4 QH**

During this rotation the students participate in providing health care to the adult outpatient under the supervision of a physician specialist in internal medi-

cine. The students will have the opportunity to become involved in the initial assessment and management of adults with a medical complaint as well as the ongoing assessment and management of patients with established diagnoses. It is anticipated that the student will be exposed to many of the common problems encountered in medical practice, such as hypertension, diabetes, and heart disease. The emphasis is on the assessment and management of both acute and chronic medical problems. *Prereq. Successful completion of first year of Physician Assistant Program.*

PA 1361 Applied Study Elective**4 QH**

Offers additional exposure to an area of clinical medicine in which the student has a special interest. Student may choose additional experience in an area covered by required rotations or select a subspecialty such as dermatology, orthopedics, cardiology, geriatrics, etc. All elective rotations are reviewed and must be approved by the clinical coordinator. *Prereq. Successful completion of first year of Physician Assistant Program.*

PA 1362 Principles of Obstetrics**2 QH**

Discusses the physiologic changes in pregnancy with nutrition, prenatal care, medical complications, and surgical complications of pregnancy, labor, and delivery. Also covers managing pre- and post-natal periods and diagnosing and treating sexually transmitted diseases. *Prereq. PA students only.*

PA 1363 Principles of Gynecology**2 QH**

Studies the anatomy and physiology of the human reproductive system, the methods and effectiveness of contraception, and any contraindications. Also explores the medical indications for abortion and the appropriateness of the various methods of pregnancy termination. Emphasizes the causes, signs, and treatments of common gynecological problems, including the significance of early cancer detection. *Prereq. PA students only.*

PA 3101 Clinical Neurology**4 QH**

Presents the clinical application of neuroanatomy and neurophysiology. Offers the opportunity to develop an understanding of the normal functioning of the nervous system as well as to develop a clinical approach to the assessment and management of a variety of nervous system disorders and disease states. *Prereq. PA students only.*

PA 3102 Principles of Electrocardiography**4 QH**

Examines principles of electrophysiology and its application to electrocardiographic tracing. Topics include recognizing arrhythmias, rate and axis determination, conduction abnormalities, characteristic changes seen in myocardial infarction and ischemia, as well as drug and metabolic effect manifested on the electrocardiogram. *Prereq. PA students only.*

PA 3103 Rehabilitation Medicine**4 QH**

Studies techniques of effective planning and decision making for patients with multiple chronic problems. The purposes, techniques, and potential of rehabilitation medicine are also discussed. *Prereq. PA students only.*

PCL 1300 Basic Pharmacology 1**2 QH**

Covers the classification, mechanism of action, and uses of a spectrum of therapeutic agents. Emphasizes dose response, side effects, and adverse reactions. *Prereq. PA students only.*

PCL 1301 Basic Pharmacology 2**3 QH**

Examines the classification, mechanisms of action, and uses of a broad spectrum of therapeutic agents. Focuses on dose response, side effects, and adverse reactions. *Prereq. PA students only.*

PHL 3265 Issues in Medical Ethics**4 QH**

Familiarizes students with various philosophical perspectives in medical ethics, including historical, classical, ethical, and contemporary philosophies related to issues such as abortion, truth telling, genetic control, and the allocation of scarce medical resources. Discusses euthanasia and paternalism, among other topics. *Prereq. PA students only.*

SOC 3226 The Aging Process**3 QH**

Studies the socioeconomic and social-psychological consequences of aging from the perspective of health care providers. Focuses on the biological changes entailed in aging and the appropriate medical management of geriatric patients. *Prereq. PA students only.*

Graduate School of Professional Accounting

*All courses carry five quarter-hours of credit unless
otherwise specified.*

ACC 3401 Accounting Problems 1

Accelerates introduction to the basic accounting process and the preparation of general-purpose financial statements. Topics include assets, liabilities, and present value concepts. *Prereq.* *Principles of accounting.* *Completion of a self-instructed, programmed text on basic accounting.*

ACC 3402 Cost Accounting Theory and Problems

Analyzes specialized problems of cost accumulation and cost behavior. Topics include cost-volume-profit analysis, standard costs and budgeting, overhead analysis, and capital budgeting. Stresses costs involved in managerial decision making.

ACC 3404 Accounting Problems 2

Continues ACC 3401, including property and equipment, depreciation, long-term liabilities, stockholders equity, earnings per share, income tax accounting, and other deferrals. *Prereq.* *ACC 3401.*

ACC 3405 Accounting Problems 3

Examines specialized accounting topics such as pensions, leases, accounting changes, statement of changes in financial position, partnerships, and government accounting. *Prereq.* *ACC 3404.*

ACC 3406 Advanced Accounting Problems

Studies business combination, including the purchase and pooling methods. Topics include intercompany profits, indirect and reciprocal holdings, and foreign currency translations. *Prereq.* *ACC 3405.*

ACC 3407 Auditing Theory and Practice

Examines auditing concepts, standards, and procedures. Topics include: the legal and ethical responsibilities of the auditor, statistical sampling, auditing and EDP, audit reports, and audit procedures. Stresses the nature and objectives of auditing. *Prereq.* *ACC 3404.*

ACC 3408 Federal Income Tax Accounting 1 **6 QH**

Studies the Internal Revenue Code, regulations, revenue rulings, and relevant cases. Emphasizes taxation of individuals, corporations, partnerships, estates and trusts, tax-planning and tax research. *Prereq.* *ACC 3404.*

ACC 3409 Federal Income Tax Accounting 2

Continues ACC 3408. Focuses on taxation of corporations, tax planning, and tax research. *Prereq.* *ACC 3408.*

ACC 3413 Contemporary Accounting Theory

Offers a capstone course on the theoretical concepts of accounting, focusing on current accounting concepts, issues, and trends. Examines standards and opinions issued by various accounting organizations.

FIN 3414 Management of Financial Resources

Uses case studies to provide a comprehensive examination of corporate financial management and capital management. Explores the various sources of capital, and discusses financial institutions and securities markets.

HRM 3403 Organizational Behavior

Uses case studies to examine behavior in profit and nonprofit organizations. Gives students an opportu-

nity to study and develop skills in behavior management.

MEC 3412 Managerial Economics (Quantitative Approach)

Considers decision-making under conditions of uncertainty: allocation of scarce resources, utilizing linear programming models, determination of optimal decision rules, sensitivity analysis, examination of the most frequently encountered sampling distributions, and economic models for estimating demand-and-cost relationship.

MGT 3415 Business Law

Examines contracts, partnerships, corporations, agency, commercial paper, sales, and other topics essential for professional development in the business and legal environment.

MGT 3416 Business Policy in a Societal Setting

Uses case studies to focus on business decisions confronting management. Examines policy decisions and their impact on various sectors of society, such as stockholders, customers, suppliers, the public and government.

MKT 3410 Marketing

Examines marketing research, as well as organizational, planning, and control systems. Topics include customer/client analysis, product/service planning, pricing, communications, advertising and sales promotion and distribution management strategies.

MSC 3404 Information Systems

Presents the principles of management information systems and focuses on issues relevant to audit and control and incorporating an introduction to computer-based systems. Examines basic computer and information systems concepts including hardware, software, and systems development. Emphasizes managing, planning, and controlling the computer resource; security and privacy issues; and computer auditing.

MSC 3409 Operations Management

Introduces the organization and management of production systems using case studies. Discusses the three major types of production systems, flow, job, and project, with special emphasis given to capacity, scheduling, inventory, and control.

MSC 3411 Information Systems

Introduces computers and management information systems, focusing on issues relevant to audit and control. Examines basic computer and information systems concepts, including computer hardware, software, and systems development. Emphasizes managing, planning, and controlling computer resources, security and privacy issues, and computer auditing.

Appendix

Academic Calendar 1990-1991

September 1990

| | | |
|-------|-------------------|--|
| 3 | Monday | Labor Day. University closed. |
| 4-7 | Tuesday-Friday | Final examinations for graduate schools. |
| 10-23 | Monday-Sunday | Vacation period. |
| 11-12 | Tuesday-Wednesday | Fall 1990 registration—Burlington 5:00-7:30 PM. |
| 13 | Thursday | Fall commencement. |
| 17-20 | Monday-Thursday | Fall 1990 registration—Boston 9:30 AM-7:00 PM. |
| 24 | Monday | Beginning of 1990-1991 academic year. Graduate classes begin. |

October 1990

| | | |
|---|--------|----------------------------------|
| 8 | Monday | Columbus Day. University closed. |
|---|--------|----------------------------------|

November 1990

| | | |
|-------|-----------------|---|
| 12 | Monday | Veterans' Day observed. University closed. |
| 22-25 | Thursday-Sunday | Thanksgiving Day recess. |
| 27 | Tuesday | Winter 1991 registration—Burlington 5:00-7:30 PM. |

December 1990

| | | |
|-------|-----------------|--|
| 3-6 | Monday-Thursday | Winter 1991 registration—Boston 9:30 AM-7:00 PM. |
| 10-14 | Monday-Friday | Final examination for graduate schools. |
| 17-31 | Monday-Monday | Christmas vacation. |

January 1991

| | | |
|----|-----------|--|
| 1 | Tuesday | New Year's Day. University closed. |
| 2 | Wednesday | Graduate classes begin. |
| 21 | Monday | Martin Luther King, Jr.'s Birthday observed. University closed. |

February 1991

| | | |
|----|--------|-------------------------------------|
| 18 | Monday | Presidents' Day. University closed. |
|----|--------|-------------------------------------|

March 1991

| | | |
|--------------|------------------------|---|
| 5 | Tuesday | Spring 1991 registration—Burlington 5:00-7:30 PM. |
| 11-14 | Monday-Thursday | Spring 1991 registration—Boston 9:30 AM-7:00 PM. |
| 18-22 | Monday-Friday | Final examinations for graduate schools. |

April 1991

| | | |
|-----------|---------------|-----------------------------------|
| 1 | Monday | Graduate classes begin. |
| 15 | Monday | Patriots' Day. University closed. |

May 1991

| | | |
|-----------|---------------|----------------------------------|
| 27 | Monday | Memorial Day. University closed. |
|-----------|---------------|----------------------------------|

June 1991

| | | |
|--------------|-----------------------|---|
| 10-11 | Monday-Tuesday | Summer 1991 registration—Boston 9:30 AM-7:00 PM. |
| 10-14 | Monday-Friday | Final examinations for graduate schools. |
| 12 | Wednesday | Summer 1991 registration—Burlington 5:00-7:30 PM. |
| 15 | Saturday | Commencement. |
| 17-23 | Monday-Sunday | Vacation period. |
| 24 | Monday | Graduate classes begin. |

July 1991

| | | |
|----------|-----------------|--------------------------------------|
| 4 | Thursday | Independence Day. University closed. |
|----------|-----------------|--------------------------------------|

September 1991

| | | |
|-------------|----------------------|---------------------------------------|
| 2 | Monday | Labor Day. University closed. |
| 9-22 | Monday-Sunday | Vacation period. |
| 12 | Thursday | Fall commencement. |
| 23 | Monday | Beginning of 1991-1992 academic year. |

Calendar dates are subject to change. The University community will be notified if such changes are necessary.

Northeastern University's Mission

Northeastern University's mission, as a large urban university founded on the cooperative model of education, is to provide excellence in education. The University achieves its mission through curricula that value equally knowledge for its own sake, knowledge as a means to success in the workplace, and knowledge as a cornerstone of personal achievement and satisfaction.

Achieving Northeastern University's mission requires excellence in teaching, and teaching remains the central activity of Northeastern's faculty. By offering undergraduate and graduate programs that are rigorous, relevant, and rewarding, the University provides a solid structure for educational excellence. Northeastern University is also committed to the search for knowledge through the scholarly and artistic undertakings of its faculty and students.

A central mandate of Northeastern University is to offer students the opportunity to apply directly lessons of the classroom and laboratory to the workplace through cooperative education. For three quarters of a century, cooperative education has been the keystone of Northeastern's uniqueness. As an increasing percentage of the nation's population enters the workforce, and new technologies continue to change the nature of work, the University has rededicated itself to helping the cooperative plan keep pace with those changes.

Northeastern University is committed to serving the educational needs of a diverse student population in an amenable physical environment. The University believes that its mission can be achieved only if the student body is not limited by economic status, cultural or racial background, geographic origin, sex, or age. Northeastern has a long history of serving the educational needs of the non-traditional student, providing degree and non-degree programs for people whose circumstances prevent them from following the standard college regimen.

Looking beyond the confines of the campus, Northeastern University is determined to maintain and strengthen its reputation as a friend to the City of Boston and a partner of the Commonwealth of Massachusetts. The University's obligation to serve the community of which it is an integral part is fulfilled primarily through the educational enterprise. Through its numerous outreach programs, the University has made striking contributions to the community in the applied social sciences, in high technology, and in the arts. Northeastern University will continue to contribute in these and other ways to the region's overall quality of life and to its economic vitality.

Accreditation

Northeastern University is accredited by the New England Association of Schools and Colleges, Inc., which accredits schools and colleges in the six New England states. Accreditation by the Association indicates that the institution has been carefully evaluated and found to meet standards agreed upon by qualified educators. The undergraduate business programs offered by Northeastern University are accredited by the American Assembly of Collegiate Schools of Business.

Equal Opportunity Employment Policy

Northeastern University does not discriminate on the basis of race, color, religion, sex, sexual preference, age, national origin, or veteran or handicap status in admission to, access to, treatment in, or employment in its programs and activities.

In addition, Northeastern will not condone any form of sexual harassment. Handbooks containing the University's nondiscrimination policies and its grievance procedures are available in the Office of Affirmative Action, 175 Ards Hall. Inquiries regarding the University's nondiscrimination policies may be directed to: Ellen S. Jackson, Dean/Director, Office of Affirmative Action, 175 Richards Hall, Northeastern University, Boston, Massachusetts 02115, (617) 437-2133.

Inquiries concerning the application of nondiscrimination policies may also be referred to the Regional Director, Office for Civil Rights, United States Department of Education, J.W. McCormack Building, Post Office Court House, Room 2222, Boston, Massachusetts 02109-4557.

Delivery of Services

The University assumes no liability, and hereby expressly negates the same, for failure to provide or delay in providing educational or related services or facilities or for any other failure or delay in performance arising out of or due to causes beyond the reasonable control of the University, which causes include, without limitation, power failure, fire, strikes by University employees or others, damage by the elements, and acts of public authorities. The University will, however, exert reasonable efforts, when in its judgment it is appropriate to do so, to provide comparable or substantially equivalent services, facilities, or performance, but its inability or failure to do so shall not subject it to liability.

The Northeastern University catalog contains current information regarding the University calendar, admissions, degree requirements, fees, and regulations, and such information is not intended to be and should not be relied upon as a statement of the University's contractual undertakings.

Northeastern University reserves the right in its sole judgment to promulgate and change rules and regulations and to make changes of any nature in its program, calendar, admissions policies, procedures and standards, degree requirements, fees, and academic schedule whenever it is deemed necessary or desirable, including, without limitation, changes in course con-

tent, the rescheduling of classes, cancelling of scheduled classes and other academic activities, and requiring or affording alternatives for scheduled classes or other academic activities, in any such case giving such notice as is reasonably practicable under the circumstances.

Northeastern will do its best to make available to you the finest education, the most stimulating atmosphere and the most congenial conditions it can provide. But the quality and the rate of progress of your academic career is in large measure dependent upon your own abilities, commitment, and effort. This is equally true with respect to professional advancement upon completion of the degree or program in which you are enrolled. The University cannot guarantee that you will obtain or succeed at any particular job; that will depend upon your own skills, achievement, presentation, and other factors such as market conditions at that time. Similarly, in many professions and occupations there are increasing requirements imposed by federal and state statutes and regulatory agencies for certification or entry into a particular field. These may change during the period of time when you are at Northeastern, and they may vary from state to state and from country to country. While the University stands ready to help you find out about these requirements and changes, it is your responsibility to initiate the inquiry because the University has no other way of knowing what your expectations and understandings are.

In brief, the University is there to offer you educational opportunities and to assist you in finding the direction in which you want to steer your educational experience. But you are a partner in this venture with an obligation and responsibility to yourself.

Family Educational Rights and Privacy Act

In accordance with the Family Educational Rights and Privacy Act of 1974, Northeastern University permits its students to inspect their records wherever appropriate and to challenge specific parts of them when they feel it is necessary to do so. Specific details of the law as it applies to Northeastern are printed in the Student Handbook and are distributed annually at registrations of University College and the graduate schools.

Office of Services for the Handicapped

The Office of Services for the Handicapped (OSH) provides a variety of support services and general assistance to all of Northeastern's disabled students and employees. The University's efforts to comply with the Rehabilitation Act of 1973 are coordinated by Ruth Bork, OSH director, 5 Ell Center, 617-437-2675. (TTY number is 617-437-2730).

Disclaimer

Tuition rates, all fees, rules and regulations, courses and course content are subject to revision by the President and the Board of Trustees at any time.

Emergency Closing of the University

Northeastern University has made arrangements to notify students, faculty, and staff by radio when it becomes necessary to cancel classes because of extremely inclement weather. AM radio stations WBZ (1030), WEEI (590), WHDH (850), WRKO (680), and FM stations WBCN (104.1), and WROR (98.5) are authorized to announce the University's decision to close. The TTY telephone number (a teletype machine) for the hearing impaired only is 437-8516. Since instructional television courses originate from live or broadcast facilities at the University, neither the classes nor the courier service operate when the University is closed.

Registration Information

To obtain course listings for the School of Law, please refer to the School of Law catalog.

In order to register for courses outside your graduate school, you *must* meet the requirements of the school offering the course(s) as well as your home school.

Students may not register for any courses outside their school unless the appropriate permit is presented at registration. Consult your graduate school office for details concerning these procedures.



5158 420



